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UTE MOUNTAIN LAND EXCHANGE ENVIRONMENTAL ASSESSMENT

JUNE 1981

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
ALBUQUERQUE DISTRICT OFFICE
ALBUQUERQUE, NEW MEXICO

I 53.19/3:

NOTICE

This draft environmental assessment should be retained to be used in conjunction with the final environmental assessment. The final assessment will incorporate this draft by reference and include modifications and corrections of the draft that are made as a result of public comment. The final statement will also include a record of public comments on this draft and the responses to those comments.

READEX MICRO best copy available

TABLE OF CONTENTS

Chapter 1
Description of the Proposed Action Alternative

Purpose of and Need for the Proposed Action 1-1
History and Background 1-1
  Offered and Selected Lands 1-1
  Scenic Easement 1-1
Description of the Proposed Action and the No Action Alternative. . . . 1-1
  Proposed Action 1-1
  No Action Alternative 1-2
Alternatives Not Analyzed in the EA 1-2
Authorizing Actions 1-2
Interrelationships with Existing Environmental Data 1-3
  Land Use Plan 1-3
  Feasibility Study 1-3
  Environmental Assessment Record on Proposed Navajo Land Exchange . . 1-3
  Summary of Resource Values and Impacts 1-11

Chapter 2
Affected Environment

Paleontology 2-1
Minerals 2-3
Water Resources 2-10
Socioeconomics 2-17
Livestock Grazing 2-19
Cultural Resources 2-24
Wilderness 2-29
Recreation 2-30
Wildlife 2-35
Land Uses 2-47
Visual Resources 2-47
Threatened or Endangered Plants 2-51

Chapter 3
Environmental Consequences

Assumptions and Analysis Guidelines 3-1
Paleontology 3-1
Minerals 3-
Water Resources 3-4
Socioeconomics 3-
Livestock Grazing 3-
Cultural Resources 3-
Wilderness 3-
Recreation 3-1
Wildlife 3-14
Land Uses 3-1
Visual Resources 3-17

Chapter 4
Consultation and Coordination

History of Scoping Efforts 4-1
Review of DEA 4-2
Public Involvement 4-2
Public Commemnts and Responses 4-2
Lists of Preparers 4-2

APPENDICES

A-1 Legal Description of Bisti Lands A-1
A-2 Legal Description for Ute Mountain Lands A-3
A-3 Resource Components on the Bisti Lands A-4

B Definitions for Importance Values Assigned to Fossil Occurrences. B-1

C Legal Description and Serial Number of Oil and Gas Leases on Bisti Lands C-1

D-1 Streamflow Near Bisti Lands in San Juan Basin 09367930- Hunter Wash at Bisti Trading Post, New Mexico D-1
D-2 Streamflow Near Bisti Lands in San Juan Basin 09367710- De-na-zin Wash Near Bisti Trading Post, New Mexico D-2
D-3 Bisti Area Peak Discharge Estimates D-3

E Principal Archeological Inventories on the Bisti Lands E-1

F-1 Inventory/Evaluation Rating Criteria and Score F-1
F-2 Scenic Quality Rating Criteria F-2
F-3 Ute Mountain Scenic Quality F-3

G Calculation of Grazing Values G-1

Glossary GL-1

References R-1

TABLES

Chapter 1
Table 1-1 Summary of Resource Values and Impacts 1-2

Chapter 2
Table 2-1 Number and Importance Values of Fossil Occurrences on the Bisti Lands 2-2
Table 2-2 Bisti Lands Occurring Within Proposed Paleontology ACECs 2-5
Table 2-3 Coal Leases and Applications on Bisti Lands 2-6
Table 2-4 Public Lands Available for Coal Lease Exchange 2-6

TABLES (Cont'd)

Chapter 2

Table 2-5 Floodplain Acreages on Bisti Lands 2-11
Table 2-6 Existing Wells on the Bisti Lands 2-12
Table 2-7 Average Monthly Discharge for the Rio Grande Near Ute Mountain 2-16
Table 2-8 Average Monthly Discharge for Costilla Creek Near Ute Mountain 2-16
Table 2-9 Water Users and Water Rights-Ute Mountain-Sunshine Valley Ground Water 2-18
Table 2-10 Factors Describing Bisti Lands 2-20
Table 2-11 Bisti Lands Allotment Information 2-23
Table 2-12 Existing Developments on Bisti Lands 2-25
Table 2-13 Archeological Resources on the Bisti Lands 2-27
Table 2-14 Estimated Demand for Selected Recreation Activities in the Chaco Planning Unit 2-33
Table 2-15 Visitor Use of the Rio Grande Wild and Scenic River Visitors Center 2-34
Table 2-16 Permitted Use on the Rio Grande Wild and Scenic River for the 1979 Season 2-34
Table 2-17 Right-of-Way Grants on the Bisti Lands 2-38

Chapter 3

Table 3-1 Bisti Lands Recommended for Exclusion from the Proposed Land Exchange Because of Paleontological Resource Values 3-3
Table 3-2 Range Sites, Condition, and Production Data for Ute Mountain Vegetation 3-10
Table 3-3 Bisti Lands to be Dropped from Exchange on the Basis of Scenic Quality 3-17

Chapter 4

Table 4-1 Document Recipients 4-3
Table 4-2 List of Preparers 4-4

MAPS

Chapter 1

Map 1-1 General Location 1-3
Map 1-2 Land Status-Bisti Lands 1-5
Map 1-3 Topography-Ute Mountain 1-7
Map 1-4 Land Status-Ute Mountain 1-9

Chapter 2

Map 2-1 Paleontological Resources 2-3
Map 2-2 Coal Leases, Applications, and Exchange 2-7
Map 2-3 Floodplain Areas 2-13
Map 2-4 Range Allotments, Developments, and Wells 2-21
Map 2-5 Wilderness Study Areas 2-31
Map 2-6 Visual Resources 2-39

chapter 1

DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

CHAPTER 1

DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVE

PURPOSE OF AND NEED FOR THE PROPOSED ACTION

The purpose of the Proposed Action is to change ownership and management of public lands located north and south of the Chaco Culture National Historical Park with private lands located north of Questa. The BLM would acquire Ute Mountain, as well as lands east of the Rio Grande Wild and Scenic River. This would result in acquiring a potential wilderness study area, wildlife habitat for game and non-game species and lands that would provide additional recreational opportunities. PNM and Franklin would acquire land for a proposed coal-fired generation station, townsite, and enlargement of land and water holdings near Bisti, New Mexico in San Juan County.

HISTORY AND BACKGROUND

Offered and Selected Lands

Negotiations on this proposed land exchange have been in progress since 1974. Because of the length and complexity of these negotiations, thier history and background is on file at the BLM Albuquerque District Office.

Scenic Easement

On October 2, 1968, the Rio Grande from the "... Colorado State Line downstream to the State Highway 96 crossing,..." was designated by Congress as a Wild and Scenic River under the Wild and Scenic Rivers Act (Public Law 90-542). In accordance with this Act, the BLM sought a buffer zone to protect the values of the Rio Grande and to prevent any developments or changes that would detract from the Wild River Area.

In September 1979, PNM and Franklin agreed to convey a scenic easement to the BLM for approximately 700 acres of land along the Rio Grande Wild and Scenic River. The easement was conveyed to the BLM on March 14, 1980. PNM and Franklin continue to own the land, while the BLM controls their activities on a quarter-mile stretch of land along the river. A copy of the Scenic Easement Agreement is on file in the BLM Albuquerque District Office.

DESCRIPTION OF THE PROPOSED ACTION AND THE NO ACTION ALTERNATIVE

Proposed Action

PNM and Franklin are proposing to exchange the surface estate on approximately 17,134 acres of private land for public land near Bisti, New Mexico. The total amount of public land being considered for exchange is approximately 29,952 acres. Of this amount, up to about 12,850 acres of public land could be exchanged for private land. Based on a preliminary appraisal, the 12,850-acre figure is the approximate amount of public land that would be equal

in value to the 17,134 acres of private land. Map 1-1 shows the location of the public and private lands being considered for exchange. The legal description for both tracts of land is in Appendices A-1 and A-2.

For ease in discussing the public lands selected for exchange by PNM and Franklin, they will be referred to as "the Bisti Lands" in this assessment. Map 1-2 shows the land status of the Bisti Lands.

For ease in discussing the private lands being offered in an exchange by PNM and Franklin, they will be referred to as "the Ute Mountain Lands" in this assessment. Map 1-3 shows the topography and location of the Ute Mountain Lands, and Map 1-4 shows the land status of Ute Mountain and adjacent lands.

Specific resource management programs on the Bisti Lands could be terminated by an exchange, or altered on areas located adjacent to the Bisti Lands. Resource management programs as determined by this EA and the BLM's planning system would be instituted on the Ute Mountain Lands.

No Action Alternative

Under the provisions of Title 43 of the Code of Federal Regulations (CFR), Part 2200, the BLM is required to act on the formal request for a land exchange by PNM and Franklin. Therefore, the No Action Alternative is to reject PNM and Franklin's formal request.

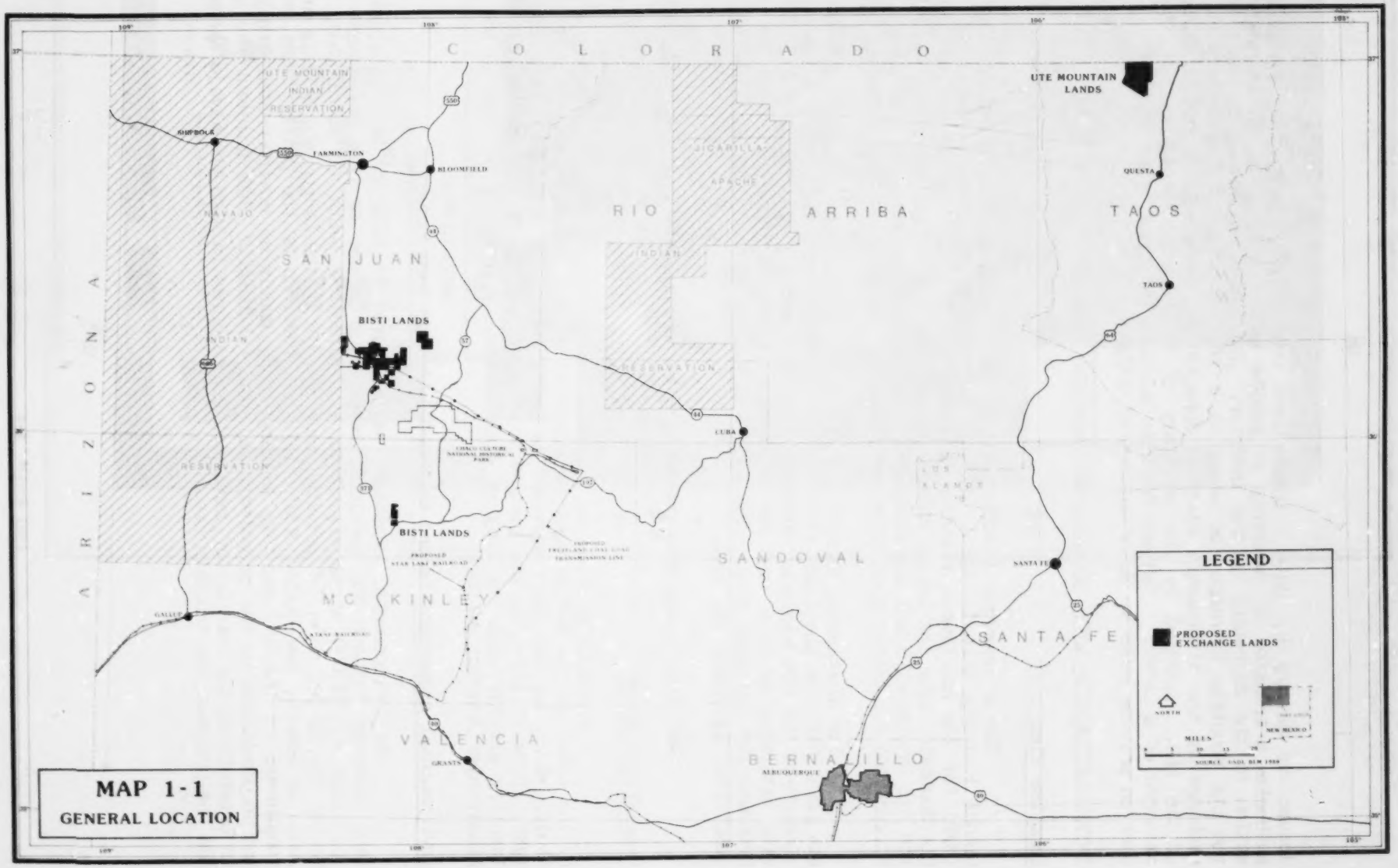
An application may be rejected if the Secretary of the Interior determines that "...the public interest will (not) be well served by making that exchange." Additionally, "...when considering public interest the Secretary concerned shall give full consideration to better Federal land management and the needs of State and local people, including needs for lands for the economy, community expansion, recreation areas, food, fiber, minerals, and fish and wildlife and the Secretary concerned finds that the values and the objectives which Federal lands or interests to be conveyed may serve if retained in Federal ownership are not more than the values of the non-Federal lands or interests and the public objectives they could serve if acquired" (Section 206 (a) of the Federal Land Policy and Management Act (FLPMA of 1976).

ALTERNATIVES NOT ANALYZED IN THE EA

PNM and Franklin may also apply for the Bisti Lands through sale, right-of-way permit, or an exchange application for less acreage. The first two alternatives would not satisfy the same purpose and need of the BLM to acquire the Ute Mountain Lands. The last alternative would not satisfy the purpose and need of PNM and Franklin to enlarge land and water holdings. The alternatives are, therefore, not analyzed in this EA.

AUTHORIZING ACTIONS

Passage of FLPMA established new policy for land exchanges. The final regulations (Exchange Procedures for Public Lands) implementing FLPMA were


COLORADO
UTE MOUNTAIN INDIAN RESERVATION
UTE MOUNTAIN LANDS
SHIPROCK
FARMINGTON
BLOOMFIELD
JICARILLA APACHE
RIO ARRIBA
TAOS
QUESTA
TAOS
NAVAJO
SAN JUAN
INDIAN
RESERVATION
BISTI LANDS
CUBA
CHACO CULTURE NATIONAL HISTORICAL PARK
LOS ALAMOS
BISTI LANDS
PROPOSED STAR LAKE RAILROAD
PROPOSED FREEDLAND-CHACO GOAL TRANSMISSION LINE
SANDOVAL
SANTA FE
ARIZONA
MC KINLEY
GALLUP
SANTA FE
VALENCIA
BERNALILLO
GRANTS
ALBUQUERQUE
LEGEND
PROPOSED EXCHANGE LANDS
NORTH
NEW MEXICO
MILES
SOURCE: USGS, BLM 1988
MAP 1-1
GENERAL LOCATION

issued on January 6, 1981. Under these regulations, the action required to authorize a transfer of ownership of public lands is approval of the proposed action by the Secretary of the Interior. This approval would, in the case of the Ute Mountain Exchange, be based on a recommendation to proceed with the exchange by the Albuquerque District Manager and the New Mexico State Director of the BLM. Approval by the Secretary of the Interior would result in the issuance of a patent. PNM and Franklin would be required to convey the warranty deed on private lands to BLM's authorized officer.

INTERRELATIONSHIPS WITH EXISTING ENVIRONMENTAL DATA

Land Use Plan

The Albuquerque District staff completed a land use plan for the Rio Grande Planning Unit in April 1975. The approved Management Framework Plan (MFP) for the Rio Grande Planning Unit requires the BLM to "Attempt to acquire Ute Mountain...for its unique natural values and the buffer area it provides to the Rio Grande Wild and Scenic River." The reason for acquiring this land is to "...provide for better protective management of the Wild and Scenic River."

The Albuquerque District staff is in the process of updating the land use plan (MFP) for the Chaco Planning Unit recommendation in the Chaco MFP is to consummate the Ute Mountain Exchange. Further analysis in the planning process will determine if this land use recommendation is compatible with other uses proposed for the same area. The update of this land use plan is scheduled for completion September 30, 1981.

San Juan County does not address the Bisti Lands in its land use plan.

Feasibility Study

A feasibility study on the proposed Ute Mountain Exchange was prepared by the staff of the BLM Albuquerque District's Taos Resource Area staff. The study, which is not an environmental assessment, was completed in September 1980. It was written to add insight to the feasibility of this exchange and to identify alternatives. A copy of the Feasibility Study is on file in the BLM Albuquerque District Office.

Environmental Assessment Record on Proposed Navajo Land Exchange

An environmental assessment was prepared in 1978 for the "...proposed land exchange between the Navajo Tribe and the Bureau of Land Management for approximately 57,000 acres of public lands located south of Farmington, New Mexico for 80,000 acres of private lands located in the Ladron and Malpais areas south of Grants, New Mexico" (BLM, 1978). Portions of the public lands being considered in the Ute Mountain Exchange have undergone environmental analysis and documentation in the proposed Navajo Land Exchange. This document was used in determining the overlap of lands being considered in both the Navajo Exchange and the proposed Ute Mountain Exchange.

R. 13 W. R. 12 W. R. 11 W. R. 10 W.

T. 24 N.

T. 23 N.

T. 22 N.

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
ALBUQUERQUE DISTRICT OFFICE
ALBUQUERQUE, NEW MEXICO

UTE MOUNTAIN EXCHANGE
ENVIRONMENTAL ASSESSMENT

BISTI LANDS
MAP 1-2

LEGEND

LAND STATUS

- SELECTED LAND
- PUBLIC
- PRIVATE
- LOCATION OF NAVAJO FAMILIES
- INDIAN
- STATE

SCALE: 1:126,720

1 0 1 2 3 MILES

NORTH

T. 18 N.

R.12W.

March 1981

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

ALBUQUERQUE DISTRICT OFFICE
ALBUQUERQUE, NEW MEXICO

UTE MOUNTAIN EXCHANGE
ENVIRONMENTAL ASSESSMENT

UTE MOUNTAIN LANDS
MAP 1-3

R.9 E. R.10 E. R.11 E. R.12 E. R.13 E.

COLORADO

T. 31 N.

T. 30 N.

T. 29 N.

COSTILLO

TOP 'O THE WORLD FARMS

Ute Mountain

Rio Grande

285

SUNSHINE VALLEY

3

BUENA VISTA

CERRO

Cerro de la Olla

Rio Grande

LEGEND

TOPOGRAPHY

OFFERED LAND

NORTH

SCALE: 1:126,720

1 0 1 2 3 MILES

CONTOUR INTERVAL - 20 METERS

MARCH 1981

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

ALBUQUERQUE DISTRICT OFFICE
ALBUQUERQUE, NEW MEXICO

UTE MOUNTAIN EXCHANGE
ENVIRONMENTAL ASSESSMENT

UTE MOUNTAIN LANDS
MAP 1-4

R.9 E. R.10 E. R.11 E. R.12 E. R.13 E.

T. 31 N.
T. 30 N.
T. 29 N.

COLORADO

COSTILLO

TOP 'O THE WORLD FARMS

Ute Mountain

Rio Grande

SUNSHINE VALLEY

BUENA VISTA

CERRO

Cerro de la Olla

LEGEND

LAND STATUS

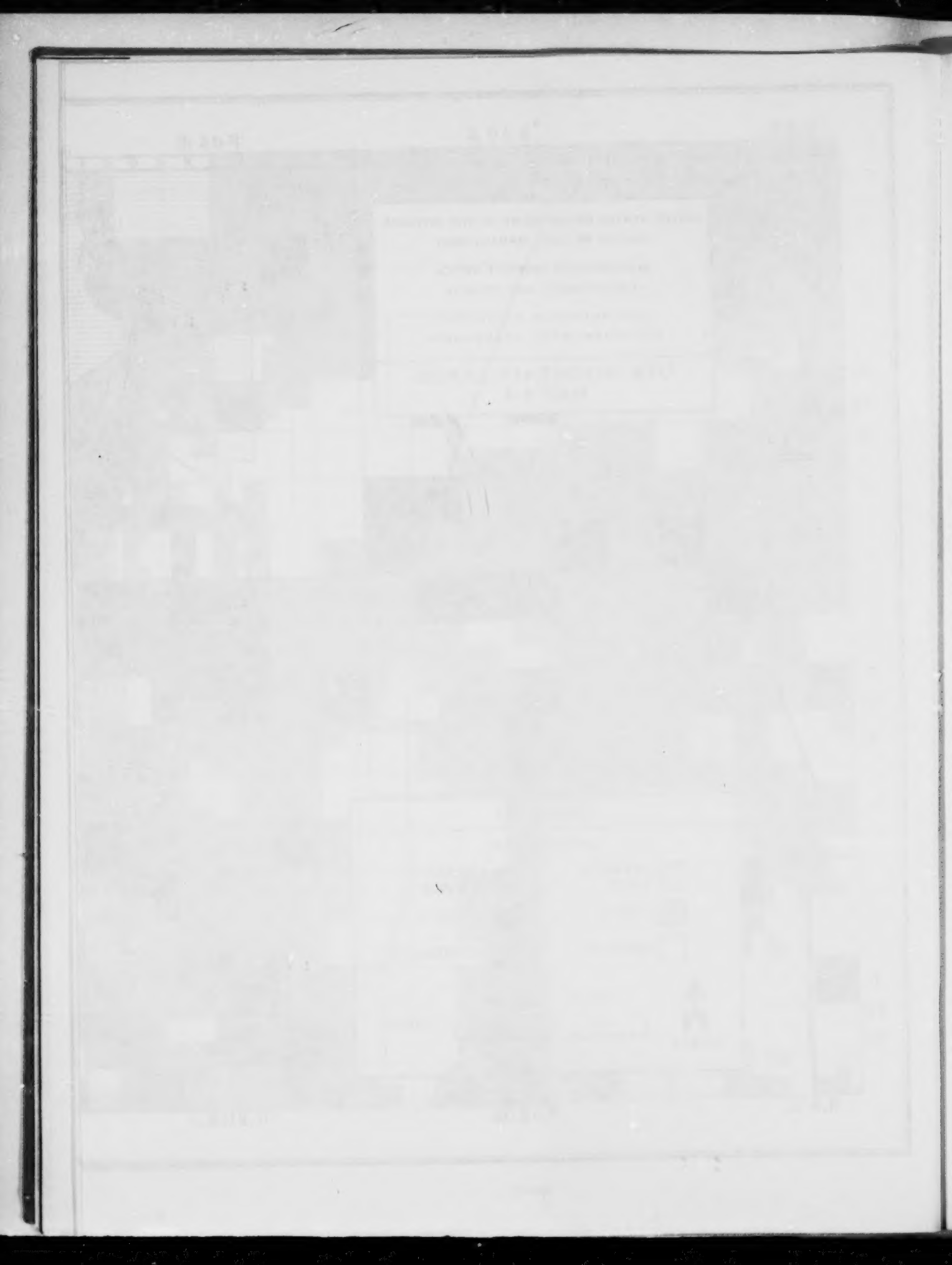
- OFFERED LAND
- FOREST SERVICE
- PUBLIC
- STATE
- PRIVATE
- WITHDRAWAL

SCALE: 1:126,720

1 0 1 2 3 MILES

NORTH

MARCH 1981



SUMMARY OF RESOURCE VALUES AND IMPACTS

Table 1-1 lists those resources on the Bisti and Ute Mountain Lands that would be affected by the proposed land exchange and summarizes the impacts on them. The table also presents mitigating measures and standard operating procedures proposed to alleviate the impacts of the exchange on the resources.

A more detailed section-by-section listing of resource values on the Bisti Lands is located in Appendix A-3 of this document.

TABLE 1-1

SUMMARY OF RESOURCE VALUES AND IMPACTS

Resource Values		Resource Impacts		Proposed Mitigating Measures	Standard Operating Procedures
Bisti Lands	Ute Mountain Lands[a/]	Bisti Lands	Ute Mountain Lands		
Paleontological Resources					
Potential paleontological Areas of Critical Environmental Concern (ACECs) have been identified and are being considered for designation in the BLM's update of the Chaco Management Framework Plan (MFP).		Up to 9,259 acres with paleontological resources could be lost from public access and federal management.		Drop 9,259 acres of the Bisti Lands (Fossil Forest and other Class I paleontological resources) from the exchange.	
Minerals					
Strippable and underground coal present.	The USGS indicates that the Ute Mountain Lands are "without value" for locatable or leasable minerals.				
Portions of two existing coal leases issued to Western Coal Co. (Sunbelt Mining Co., a subsidiary of PNM).					
Competitive coal lease application filed by Western Coal Co. includes about 643 acres of the Bisti Lands.					
Seven Preference Right Lease Applications, filed by Arch Minerals and Eastern (Coal suppliers to PNM) pending on about 14,097 acres. (Eastern a co-generator with PNM).					
Approximately 2,640 acres of coal listed in P.L. 96-475 for exchange with Western Coal Co. for coal in the Bisti Wilderness Study Area.					

TABLE 1-1 (Cont'd)

Resource Values		Resource Impacts		Proposed Mitigating Measures	Standard Operating Procedures
Bisti Lands	Ute Mountain Lands	Bisti Lands	Ute Mountain Lands		
Minerals (Cont'd)					
Coal exploration license application from Salt River Project is pending for lands in T. 23 and 24 N., R. 11 W.		48 oil and gas leases.			Lessees have prior and existing rights that allow them to develop their lease on private lands.
PNM subsidiaries (Paragon Resources and Public Service Land Company) hold 879 mining claims on the Bisti North Lands.		Surface disturbance would occur on private land.			
Phillips Uranium holds 140 mining claims on the Bisti South Lands.		Phillips would lose the surface estate used to develop the claim and the opportunity to patent the surface estate of their claims.		Place a clause in the patent to reserve the prior existing rights of Phillips to patent the surface estate.	
				Phillips would be required to negotiate with the new land owner for use of the surface estate in developing mining claims.	
		If Phillips patents the surface estate of any of their mining claims, PNM could lose up to 2,009 acres of surface estate on lands acquired in the proposed exchange.			
Deposits of sand, gravel, and humates are present.	Deposits of sand and gravel are present.				
Mineral (subsurface) rights would remain in federal ownership and management. The public would be allowed to continue to explore, stake claims and apply for leases, and develop claims and leases for federal minerals under private land.	Mineral (subsurface) rights would remain in private ownership by PNM, Franklin, A. K. McMillan, and Rio Costilla Cooperative Livestock Association, who would be allowed to explore and develop for minerals.	Surface disturbance to private lands would occur during exploration and development of federal minerals.	Surface disturbance to federal lands would occur during exploration and development of private minerals.	Require the companies and individuals holding the mineral rights on Ute Mountain to comply with BLM surface reclamation requirements.	Require the companies and individuals holding the mineral rights on Ute Mountain to comply with BLM surface reclamation requirements.

TABLE 1-1 (Cont'd)

Resource Values		Resource Impacts		Proposed Mitigating Measures	Standard Operating Procedures
Bisti Lands	Ute Mountain Lands[a]	Bisti Lands	Ute Mountain Lands		
Minerals (Cont'd)					
		Section 209 of FLPMA[b] does not provide for reimbursement to the surface owner for damages due to mineral energy.			Require the companies and individuals holding the mineral rights on Ute Mountain to comply with BLM surface reclamation requirements.
Access for the public to explore and develop federal mining claims and oil and gas leases on private land is guaranteed by the BLM.	Access to explore for minerals is guaranteed to the companies and individuals holding the mineral rights.				
	A scenic easement agreement between PNM, Franklin, and BLM restricts actions by the companies on a quarter-mile stretch of land along the Rio Grande Wild and Scenic River. Mr. A. K. McMillan has access to land along the river.		Surface disturbances could occur during mineral exploration of land next to the river.	Obtain a scenic easement from Mr. A. K. McMillan.	
Water Resources					
Approximately 1,500 acres of floodplains have been identified.		The BLM could lose management of up to 1,500 acres of floodplains.			
Six USGS observation wells and four stockwater wells exist (1 stockwater well is owned by BLM, 2 by Paragon Resources, and 1 by Phillip Uranium).		Access for USGS, Phillips, and Indian livestock operators may be lost.		Place a clause in the patent to reserve access to wells by USGS, Phillips, and Indian livestock operators.	Place a clause in the patent to restrict the uses that can occur on these floodplains (specifically construction).
					Reimburse BLM and Phillips for water developments that can not be removed from land selected in an exchange.
Poor quality surface water and fair to poor quality ground water, at low yields, is present.	Good quality ground water, at high yields, is present.			Develop new water sources.	
	Periodic low streamflow occurs in the Rio Grande.		Decline of fish habitat, and deteriorating water quality aesthetics.		
Socioeconomics[c]					

TABLE 1-1 (Cont'd)

Resource Values		Resource Impacts		Proposed Mitigating Measures	Standard Operating Procedures
Bisti Lands	Ute Mountain Lands[a/]	Bisti Lands	Ute Mountain Lands		
Livestock Grazing					
Nine Indian operators graze livestock.		The total known livestock grazing resource of up to 9 Indian livestock operations could be eliminated. Up to 667 Animal Unit Months (AUMs) could be eliminated. Up to $1,504 could be lost to the government in annual revenue from grazing permits.		Select other Bisti Lands prior to selecting lands with Indian allotments.	
Phillips Uranium holds a grazing lease on the Bisti South Lands.		All of the public lands and up to 264 AUMs within the Phillips' grazing lease could be elimiated. Up to $609 could be lost to the government in annual revenue from this grazing permit.			
Portions of two grazing allotments, totaling 19,872 acres, are held by Paragon Resources, a PNM subsidiary.		A portion of 2,118 AUMs could be eliminated from federal management, and part of $4,892 could be lost to the government in annual revenue for grazing permits.			
Range condition is not known for the vegetation on the Bisti Lands.	On the Ute Mountain Lands, 8,160 acres (62%) of vegetation are in poor condition; 3,537 acres (27%) and 1,362 acres (11%) are in fair and good condition respectively.		Range condition may limit livestock grazing.	Fencing and water developments may be necessary before cattle grazing could occur on the Ute Mountain Lands.	
Cultural Resources					
Inventories have been conducted on 9,432 acres.	Seven sites identified (2 undiagnostic lithic scatters, 1 late prehistoric/early historic	Public access and federal management of up to 12,850 acres of the Bisti Lands		The BLM would consult with the State Historic Preservation officer on:	**Class III cultural resource inventories will be conducted on the Bisti Lands selected in the proposed land exchange.**

TABLE 1-1 (Cont'd)

Resource Values		Resource Impacts		Proposed Mitigating Measures	Standard Operating Procedures
Bisti Lands	Ute Mountain Lands[1]	Bisti Lands	Ute Mountain Lands		
Cultural Resources (Cont'd)					
Lithic and Archaic sites comprise 57 percent of the known sites. Anasazi sites represent 7 percent of the known sites. Navajo sites could total 36 percent of the known sites. 640 acres of Pierre's Ruin and Lake Valley outliers are on or adjacent to the Bisti Lands respectively. Possibly three roads of the Chacoan Road system, totaling approximately 11.67 miles, may cross the Bisti Lands.	habitatian site, 4 historic sites).	the Bisti Lands containing cultural resources could be lost.		1. Cultural resource Inventories for the Bisti Lands selected in the proposed land exchange. 2. Sites eligible for State or National Register of Historic Places. 3. Mitigation plans for National Register-eligible sites and Chacoan Road segments, if found.	
Wilderness					
Three wilderness study areas (WSAs) are located adjacent to the Bisti Lands. The three WSAs (Bisti, De-na-zin, and Ah-shi-sle-pah) are of an ecotype sparsely represented in the National Wilderness Preservation System.	Preliminary determinations indicate that the Ute Mountain Lands may qualify for a WSA designation. The WSA would be of an ecotype that is well represented in the National Wilderness Preservation System.	A loss of federal management would occur for any lands selected adjacent to the WSAs. The BLM may not be able to provide additional protection and management.		Select other Bisti Lands prior to selecting lands adjacent to the Bisti and De-na-zin WSA. Additional protection and management may be needed for the Bisti and De-na-zin WSAs, particularly along their periphery.	
Recreation					
Potential recreation ACECs are being considered for designation in the BLM's planning update for the Chaco MFP. These		A loss of federal management would occur for any lands selected adjacent to the potential ACECs.		Select other Bisti Lands prior to selecting lands adjacent to the potential ACECs.	

TABLE 1-1 (Cont'd)

Resource Values		Resource Impacts		Proposed Mitigating Measures	Standard Operating Procedures
Bisti Lands	Ute Mountain Lands[a/]	Bisti Lands	Ute Mountain Lands		
Recreation (Cont'd)					
potential ACECs have the same boundaries as the WSAs.				Additional protection and management, above what would be prescribed for a designated ACEC may be needed, particularly along the periphery of the potential ACEC.	
		The BLM may not able to provide additional protection and management.			
The Fossil Forest and Tanner Lake Way Station (trading post) are located on the Bisti Lands.		Public ownership and management could be lost on these lands.		Drop the acreage of the Fossil Forest and Tanner Lake Way Station (about 5 acres) from the exchange.	
Recreation opportunities such as sightseeing, ORV, hiking, and rock collecting occur.	Because the Ute Mountain Lands are under private ownership, they are closed to the public and recreational activities are not available.	These recreational opportunities would be moved to lands adjacent to the lands selected in the exchange or to other areas in the San Juan Basin.			
	Backpacking, hiking, and limited fishing are recreational opportunities that could occur on the Ute Mountain Lands under federal ownership.				
Wildlife					
The bald eagle (endangered), peregrine falcon (endangered), and the black-footed ferret (endangered) are federal and state listed species that may occur.	The same federal listed species as for the Bisti Lands may occur on the Ute Mountain Lands. The state listed species include the three federal species and the western toad (Group II), marten (Group II), and mink (Group II).				Section 7 consultation with the Fish and Wildlife Service will be conducted if a decision is made to exchange the Bisti Lands for Ute Mountain Lands. The Section 7 consultation would be conducted on those lands selected for exchange.

TABLE 1-1 (Cont'd)

Resource Values		Resource Impacts		Proposed Mitigating Measures	Standard Operating Procedures
Bisti Lands	Ute Mountain Lands[a/]	Bisti Lands	Ute Mountain Lands		
Wildlife (Cont'd)					
The Bisti Lands are not within an officially designated New Mexico Department of Game and Fish herd unit.	Less than 1 percent of the Ute Mountain Lands are in each of 3 herd units (Sangre de Cristo Deer Herd Unit, Maxwell Elk Herd Unit, or Tres Piedras Antelope Herd Unit).	The BLM would lose management of land being utilized by a small number of antelope.		Construction of water developments and fencing, and supply of adequate forage on those lands adjacent to the Bisti Lands selected in the exchange.	May drop Bisti Lands acreage having threatened or endangered species habitat from the exchange.
Habitat is of the plains grassland biome.	Habitat is comprised of portions of four diverse biomes: petran sub-alpine conifer forest and woodland; Great Basin conifer woodland; plains grassland; and Great Basin desert shrub.				
Species diversity is composed of approximately 34 species of mammals, 72 species of birds, 12 species of reptiles, and 6 species of amphibians.	Species diversity is composed of approximately 60 species of mammals, 172 species of birds, 16 species of reptiles, 7 species of amphibians, and 13 species of fish. Habitat for about 159 species could be added to federal management.	The habitat for up to 21 species of wildlife may not be managed by the BLM.			
Land Uses					
Right-of-way (ROW) permits have been granted for transmission lines, roads, a railroad, meteorological sites, and observation wells.		Future ROWs and expired permits would not be granted or extended by the BLM.		Future ROWs and expired permits would be negotiated with the new surface owner.	Place a clause in the patent to reserve the prior existing rights granted to the permittees for current permits issued under federal ownership. This reservation would not include the permits granted to PNM for meteorological sites and an electrical distribution line.
Six tracts of approximately 1,029 acres of the Bisti Lands are occupied by Navajo families. Two of these tracts are withdrawn for 20 years pending completion of the Navajo Land Exchange.					

TABLE 1-1 (Concluded)

Resource Values		Resource Impacts		Proposed Mitigating Measures	Standard Operating Procedures
Bisti Lands	Ute Mountain Lands[a/]	Bisti Lands	Ute Mountain Lands		
Land Uses (Cont'd)					
The Bisti Lands are used by American Indians in collecting herbs and sandstone.		Herbs and sandstone located on lands selected in the exchang would be closed to the Indians.			May suspend the exchange application on four tracts in accordance with 43 CFR 2091.5. The two tracts under withdrawal for the Navajo Exchange cannot not be exchanged as long as they are withdrawn.
Ten apparent Navajo burial sites and an unknown number of religious sites are located on the Bisti Lands.		Burial and religious sites located on lands selected in the exchange would be closed to the Navajos.		The BLM would negotitate an agreement to establish procedures for relocating burial sites on Indian land. The BLM would consult with American Indian religious practicioners to develop mitigating measures for sacred sites.	
Visual Resources					
Class A scenic values have been identified for the Bisti Lands located East and West of the Bisti WSA and south-southwest of the De-na-zin WSA.	The Rio Grande Wild and Scenic River has been identified as having Class A scenic values.				
A potential Scenic ACEC has been identified for lands with Class A scenic values and is being considered for designation in the BLM's planning update for the Chaco Planning Unit.		Up to 2,608 acres of the Bisti Lands with visual (scenic) resources could be lost from public access and federal management.		Drop 2,608 acres of the Bisti Lands with Class A scenic value, identified as a potential ACEC, from the exchange.	

Notes: a/ Environmental components not discussed under Ute Mountain Lands do not occur on them.
b/ FLPMA=the Federal Land Policy and Management Act of 1976.
c/ Socioeconomic information is listed throughout the table, as it relates to the other resources.

chapter 2

AFFECTED ENVIRONMENT

CHAPTER 2

AFFECTED ENVIRONMENT

This chapter describes the resource components of the environment that would be impacted by the Ute Mountain Exchange. These resources include: paleontology, minerals, watershed, social and economic conditions, livestock grazing, cultural resources, wilderness, recreation, wildlife, land uses, visual resources, and threatened or endangered plants. The descriptions reflect the expected magnitude and intensity of the impacts discussed in Chapter 3. Resources not impacted by the exchange are not described. Technical material supporting these descriptions and the analysis in Chapter 3 is located in the appendix of this document or on file at the BLM Albuquerque District Office.

PALEONTOLOGY

Bisti Lands

Fossiliferous rocks within the area of the Bisti Lands include the Cretaceous Age Menefee, Cliff House, Lewis, Pictured Cliffs, Fruitland, and Kirtland Formations, and the early Tertiary Ojo Alamo and Nacimiento Formations. However, recent paleontologic surveys have revealed that the most important of these on the Bisti Lands are the Fruitland and Kirtland Formations (Kues, et al., 1977; USDI, BLM 1981). Past paleontologic studies have shown that these two formations contain valuable remains of dinosaurs and other reptiles, some of the earliest mammals, invertebrates, and plants (Kues, et al., 1977). A list of all presently known fossil taxa from the Fruitland and Kirtland Formations is presented in Appendix B of the Star Lake-Bisti Regional Coal Final Environmental Statement (USDI, BLM 1979).

Known fossil occurrences in Fruitland/Kirtland strata on the Bisti Lands are listed in Table 2-1. This table also shows the importance value for each occurrence. As used in this EA, importance values (ranging from Class I-Critical to Class IV-Not Important) are based on the definitions provided by Kues, et al. (1977). The definitions for the particular fossil classes are located in Appendix B of this document.

Some Bisti Lands occur within proposed Areas of Critical Environmental Concern (refer to Glossary) for paleontologic values (USDI, BLM 1980c). The tracts involved are shown in Table 2-2 and on Map 2-1. One of these tracts, an area called the Fossil Forest, is presently under long-term paleontologic study by the BLM's Albuquerque District Office in cooperation with the New Mexico Bureau of Mines and Mineral Resources. This study began in the fall of 1979 and is expected to last for five or more years.

Ute Mountain Lands

The exposed rocks on the Ute Mountain Lands are igneous and contain no paleontological resources.

TABLE 2-1

NUMBER AND IMPORTANCE VALUES OF FOSSIL OCCURRENCES ON THE BISTI LANDS

Tract	Class I (Criticial)	Class II (Highly Important)	Class III (Important)	Class IV (Not Important)
T. 23 N., R. 12 W., NMPM				
Sec. 6 (Lots 8-23)			3	8
Sec. 13 (Lots 1-16)	1	4	19	40
Sec. 14 (Lots 1-8, $NW^{1/4}$)	1	4	30	55
Sec. 17 (Lots 1-13)			3	17
Sec. 22 (Lots 1-16)		2	5	9
Sec. 23 (Lots 1-[illegible], $S^{1/2}$)	1	12	52	81
Sec. 24 (Lots 1-8)	1	6	20	46
Sec. 26 (All)		1	10	20
T. 23 N., R. 13 W., NMPM				
Sec. 1 (All)		6	5	11
Sec. 11 (Lots 1-4, $N^{1/2}$, $N^{1/2}S^{1/2}$)	1	8	6	7
Sec. 12 (Lots 1-4, $N^{1/2}$, $N^{1/2}S^{1/2}$)				1
Sec. 24 (All)		1	1	
Sec. 28 (All)			1	1
TOTALS (GRAND TOTAL = 500)	5	44	155	296

Sources: Kues, et al. 1977; USDI, BLM 1981.

R. 13 W. R. 12 W. R. 11 W. R. 10 W.

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ENVIRONMENTAL ASSESSMENT

BISTI LANDS
MAP 2-1

T. 24 N.

T. 23 N.

T. 22 N.

RESERVATION

INDIAN

NAVAJO

371

57

BISTI TRADING POST

Hunter Wash

Wash

De-Na-Zin Wash

Coal Creek

Chaco Wash

LEGEND

PALEONTOLOGICAL RESOURCES

- CLASS I POTENTIAL PALEONTOLOGICAL ACEC
- FOSSIL FOREST
- SELECTED LAND

SCALE: 1:126,720

1 0 1 2 3 MILES

NORTH

CONTOUR INTERVAL - 20 METERS

R. 13 W. R. 12 W. R. 11 W. R. 10 W.

March 1981

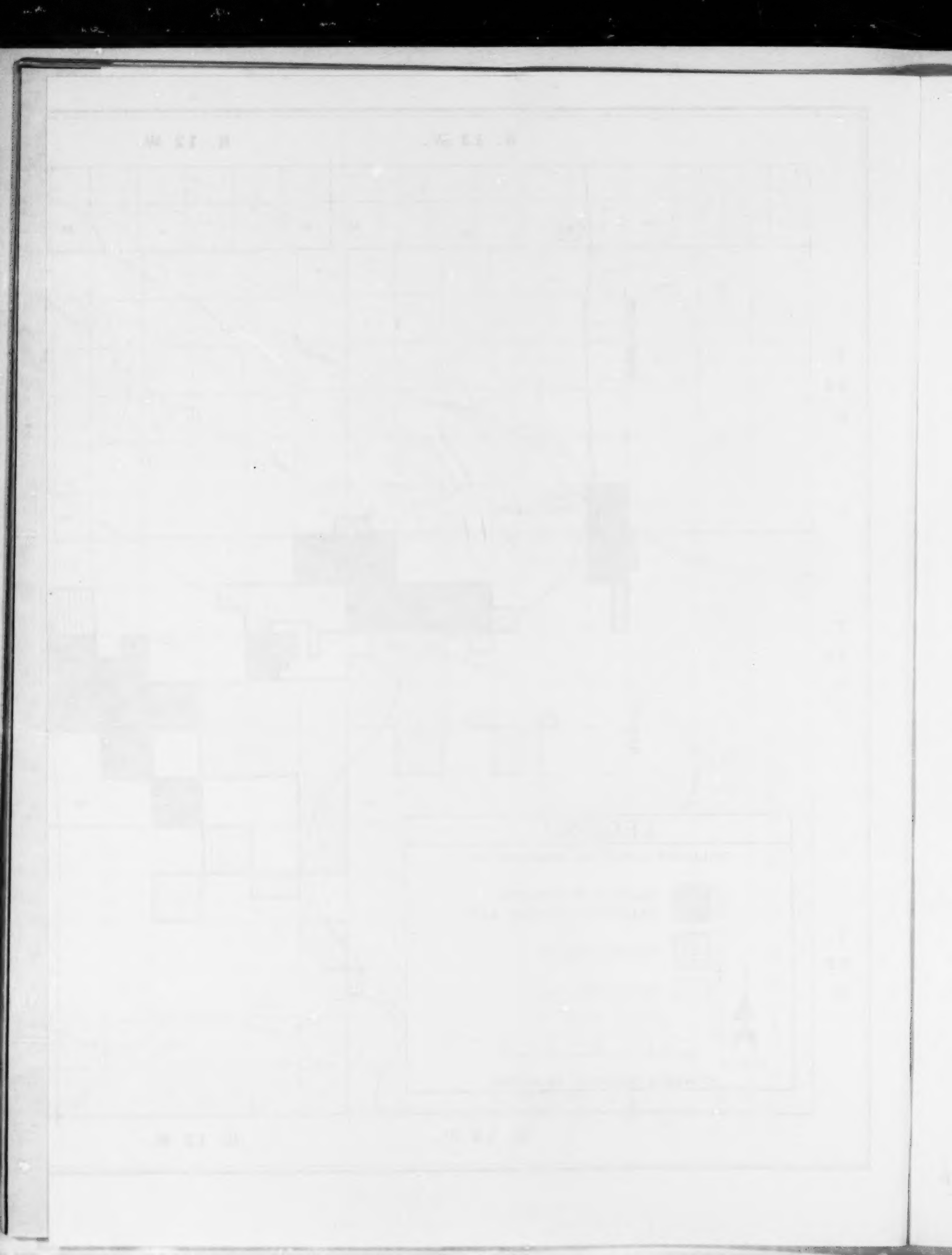

TABLE 2-2

BISTI LANDS OCCURRING WITHIN PROPOSED PALEONTOLOGY ACECs

	Acreage
T. 23 N., R. 12 W., NMPM	
Section 6, Lots 8-23	679.36
Section 13, Lots 1-16	666.65
Section 14, Lots 1-8, NW1/4 (Fossil Forest)	491.93
Section 23, Lots 1-8, S1/2	649.63
Section 24, Lots 1-8, S1/2	650.20
Section 26, All	640.00
Section 34, All	640.00
T. 23 N., R. 13 W., NMPM	
Section 1, All	640.00
Section 6, Lots 1-4, E1/2, E1/2W1/2	522.92
Section 10, Lots 1-4, N1/2, N1/2S1/2	653.36
Section 11, Lots 1-4, N1/2, N1/2S1/2	650.28
Section 12, Lots 1-4, N1/2, N1/2S1/2	643.52
T. 24 N., R. 13 W., NMPM	
Section 31, Lots 1-4, E1/2, E1/2W1/2	525.57
TOTAL	8,053.42

Source: USDI, BLM 1980c.

MINERALS

Bisti Lands

Coal

Portions of the Bisti Lands involve nine coal leases and applications. Table 2-3 gives more detailed information about these leases and applications overlapping the Bisti Lands. Map 2-2 also shows these areas.

As shown on Table 2-3, approximately 870 acres of the NM-0186612 lease are included in the proposed Ute Mountain Exchange. This acreage and a portion of another outstanding coal lease (NM-0186613) are also located in the Bisti Wilderness Study Area (WSA). Both leases were issued to Western Coal Company, now Sunbelt Mining Company, a subsidiary of PNM. Under Public Law 96-475 (94 Stat. 2269), signed October 1980, Sunbelt can obtain other coal-bearing federal lands in New Mexico in exchange for those leases. The public lands from which selection would occur for this coal lease exchange are listed in Table 2-4. Approximately 2,640 acres of the lands provided for the coal lease exchange overlap with land being considered for the Ute Mountain Exchange.

A coal exploration license application from the Salt River Project is pending for lands in T. 23 and 24 N., R. 11 W. Several other companies have expressed interest in drilling in the area to obtain information on coal.

TABLE 2-3

COAL LEASES AND APPLICATIONS ON BISTI LANDS

Lease No.	Type	Owner/ Applicant	Total Lease Acreage	Approx. Acreage Overlap	Percent of Lease Overlapping Exchange
NM-3752	PRLA[a]	Ark Land[b]	3,759.81	3,020	80
NM-3753	PRLA	Ark Land	2,950.78	1,000	34
NM-3754	PRLA	Ark Land	3,075.32	2,240	73
NM-3835	PRLA	Eastern[b,c]	4,499.84	1,280	28
NM-3838	PRLA	Eastern	4,786.76	80	2
NM-6802	PRLA	Eastern	339.98	339.98	100
NM-19986	Competitive Coal Lease Application	Western Coal[d]	8,640	3,240	38
NM-0186612	Outstanding Coal Lease	Western Coal	2,188.62	870	40
NM-0186615	Outstanding Coal Lease	Western Coal	2,027.16	2,027.16	100

Note: [a] Preference Right Lease Application

[b] Coal supplier to PNM (Ark Land formerly Arch Minerals).

[c] Co-generator with PNM.

[d] PNM subsidiary.

TABLE 2-4

PUBLIC LANDS AVAILABLE FOR COAL LEASE EXCHANGE

Legal Description	Acreage Overlap with Bisti Lands
T. 23 N., R. 12 W., Sec. 5, $S^{1/2}$	0
6, $S^{1/2}$	320
7, All	600
8, All	480
9, $W^{1/2}$	160
17, $E^{1/2}$, $E^{1/2}W^{1/2}$, $NW^{1/4}W^{1/4}$	480
18, $N^{1/2}N^{1/2}$	40
20, $NE^{1/4}$, $NE^{1/4}NW^{1/4}$	200
21, $W^{1/2}NW^{1/4}$	80
T. 23 N., R. 13 W., Sec. 1, $NW^{1/4}$, $NW^{1/4}SW^{1/4}$, $N^{1/2}NE^{1/4}$, $SE^{1/4}NE^{1/4}$, $NE^{1/4}SE^{1/4}$	280
TOTAL	2,640

R. 13 W. R. 12 W. R. 11 W. R. 10 W.

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ALBUQUERQUE DISTRICT OFFICE
ALBUQUERQUE, NEW MEXICO

UTE MOUNTAIN EXCHANGE
ENVIRONMENTAL ASSESSMENT

BISTI LANDS
MAP 2-2

T. 24 N.

T. 23 N.

T. 22 N.

RESERVATION

INDIAN

NAVAJO

371

57

BISTI TRADING POST

Wash

Hunter Wash

Alkali Creek

Coal Creek

De-Na-Zin Wash

Chaco Wash

LEGEND

COAL LEASES, APPLICATIONS, & EXCHANGE

- COAL LEASE
- BISTI COAL LEASE
- PREFERENCE RIGHT LEASE APPLICATION

SCALE: 1:126,720

NORTH

1 0 1 2 3 MILES

CONTOUR INTERVAL - 20 METERS

R. 13 W. R. 12 W. R. 11 W. R. 10 W.

March 1981

Oil and Gas

In a letter dated February 11, 1980, the U.S. Geological Survey (USGS) indicated that all of the Bisti Lands are valuable for oil and gas. However, according to the BLM's Chaco Planning Unit Resource Analysis, there were no producing oil or gas wells on the Bisti Lands as of January 1, 1980.

There are approximately 48 oil and gas leases on the Bisti Lands. The serial numbers and legal descriptions of these leases, to the nearest section, are listed in Appendix C.

Locatable Minerals

Phillips Uranium has 140 claims staked on the Bisti South Lands. Public Service Land Company and Paragon Resources Company, both subsidiaries of PNM, have a total of 879 claims, all of which are on the Bisti North Lands. All of the claims on the Bisti Lands are lode claims (refer to Glossary). This type of claim allows the claimant to use the surface and any of the surface resources on the claim.

Salable Minerals

There are large deposits of sand, gravel, and humates (refer to Glossary) on the Bisti Lands, but there has not been enough study on these deposits for exact reserves to be estimated. The sand and gravel is found along most washes, and the humates are generally associated with coal deposits.

Salable minerals are sold by the BLM in one of two ways. Sales for less than $5,000 can be made noncompetitively upon request if no competitive interest exists. The limit is $10,000 if the material is used in connection with a federal lease and it is not practical to obtain competition. Sales over $5,000 (where material is not used in connection with a federal lease) must be competitive, and the BLM must guarantee access.

Ute Mountain Lands

Mineral rights on the Ute Mountain Lands are owned by three different parties. PNM and Franklin, as cotenants, own three-eights of the mineral interest. Mr. A. K. McMillan also owns three-eights of the mineral interest. The Rio Costilla Cooperative Livestock Association owns one-fourth non-participating interest.

PNM and A. K. McMillan can explore and develop minerals on these lands. The association cannot initiate mineral exploration or development action, but is guaranteed profits from any mineral discovery and development by PNM, Franklin, or A. K. McMillan. All three parties are guaranteed the right of ingress and egress for the purpose of exploring for, and removing oil, gas, and other minerals. They also can obtain rights-of-way for roads, ditches, and utilities (PNM, 1979).

PNM and Franklin conveyed a scenic easement to the BLM in March 1980, which gives the BLM control over PNM and Franklin's activities on a quarter-mile stretch of land along the river. PNM and Franklin cannot undertake any surface-disturbing activities within this scenic easement. They can conduct any mining activities on the rest of the Ute Mountain Lands.

In a letter to the BLM dated February 11, 1980, the USGS indicated that the Ute Mountain Lands are without value for minerals.

WATER RESOURCES

Bisti Lands

The Bisti Lands are within the Chaco River watershed, a tributary of the San Juan River. All streams in this area are ephemeral, with surface runoff occurring in direct response to snowmelt or local, high-intensity thunderstorms. Flow in streams in this area lasts for 2 to 25 hours following thunderstorms and up to 2 weeks after snowmelt.

The Bisti Lands are drained by two major tributaries to Chaco Wash, Hunter Wash and De-na-zin Wash. Streamflow data for these two channels is summarized in Appendices D-1 and D-2. The tables document the very low monthly and annual runoff in the area. Peak flows and recurrence intervals for various channels in the area have been estimated and are presented in Appendix D-3.

Flood Hazard Boundary Maps prepared by the Federal Insurance Administration indicate numerous floodplains occur on the Bisti Lands. (Copies of these maps are available in the BLM Albuquerque District Office.) Table 2-5 lists the floodplain acreage in each section being considered for exchange. Total floodplain acreage on the Bisti Lands is estimated at 1,491 acres. Map 2-3 shows the major floodplains in the area.

The quality of surface waters is poor because of high concentrations of suspended and dissolved solids. (Data on the chemical quality of runoff from five different locations throughout the Bisti Lands is contained in file material at the BLM Albuquerque District Office). Parameters include major dissolved ions, nutrients, organic carbon, trace elements and radiochemicals. The predominant ions are sodium, bicarbonate, and sulfate. Dissolved trace elements are low, but total concentrations are high because of high suspended sediment concentration.

Suspended sediment concentrations are high in all surface runoff from the Bisti Lands, being highest in rainfall runoff. De-na-zin Wash averages 369,000 tons per year, a yield of 0.92 acre-feet per square mile per year. In general, surface water quality appears to be a function of the percentage of badlands in the drainage.

Ground water is available on the Bisti Lands. At lease 19 geologic formations are known to yield water, although most yields are low (less than 5 gallons per minute-gpm). The Gallup Sandstone, the Westwater Canyon Member of the Morrison Formation, and the Entrada Sandstone have potential to yield 100 gpm or more; however, these formations are greater than 3,000 feet deep in this area.

Twenty wells are known to exist on the Bisti Lands, and all draw water from poor, shallow aquifers (Table 2-6 and Map 2-4). Nine are observation wells for Public Service Company of New Mexico, and six are observation wells for the U.S. Geological Survey. Of the four BLM wells, the Bisti No. 3 well was drilled in 1964 at an expense to the BLM of $7,753. Jacob's well was drilled in 1965 under a cooperative agreement at a cost to the permittee of $23,400. Costs of drilling the other two stockwater wells were borne by BLM permittees, who then

TABLE 2-5

FLOODPLAIN ACREAGES ON BISTI LANDS

Location	Channel Designation	Acres
T. 24 N., R. 13 W., Sec. 31	Hunter Wash	86
T. 24 N., R. 13 W., Sec. 36	Alamo & Willow Washes	46
T. 24 N., R. 11 W., Secs. 22, 27, and 28	De-na-zin Tributary	71
T. 23 N., R. 13 W., Sec. 1	Alamo Wash	88
T. 23 N., R. 13 W., Sec. 6	Hunter Wash Tributary	28
T. 23 N., R. 13 W., Sec. 12	Alamo Wash De-na-zin Tributary	91 11] 102
T. 23 N., R. 13 W., Sec. 13	Alamo Wash De-na-zin Wash	11 72] 83
T. 23 N., R. 13 W., Sec. 14	De-na-zin Wash	155
T. 23 N., R. 12 W., Sec. 6	De-na-zin Tributary	20
T. 23 N., R. 12 W., Sec. 7	De-na-zin Tributary De-na-zin Wash	27 44] 71
T. 23 N., R. 12 W., Sec. 8	De-na-zin Wash & Coal Creek	129
T. 23 N., R. 12 W., Sec. 9	De-na-zin Wash	28
T. 23 N., R. 12 W., Secs. 12, and 13	Coal Creek	36
T. 23 N., R. 12 W., Sec. 13	Coal Creek	17
T. 23 N., R. 12 W., Sec. 14	Coal Creek	26
T. 23 N., R. 12 W., Sec. 17	Coal Creek Tanner Lake	2.5 8.3] 10.8
T. 23 N., R. 12 W., Sec. 18	De-na-zin Wash	19
T. 23 N., R. 12 W., Sec. 19	De-na-zin Tributary	8.0
T. 23 N., R. 12 W., Sec. 20	De-na-zin Tributary	75
T. 23 N., R. 12 W., Sec. 21	De-na-zin Tributary	5.3
T. 23 N., R. 12 W., Sec. 22	Coal Creek Tributary	33
T. 22 N., R. 13 W., Sec. 24	Tsaya & Chaco Canyon	38
T. 22 N., R. 12 W., Sec. 10	Tsaya Canyon	99
T. 22 N., R. 12 W., Sec. 18	Tsaya Canyon	77
T. 18 N., R. 12 W., Sec. 2	Kim-me-ni-oli Tributary	41
T. 18 N., R. 12 W., Sec. 11	Kim-me-ni-oli Tributary	38
T. 18 N., R. 12 W., Sec. 14	Kim-me-ni-oli Tributary	2.8
T. 18 N., R. 12 W., Sec. 23	Kim-me-ni-oli Tributary	58
TOTAL		1,491.0

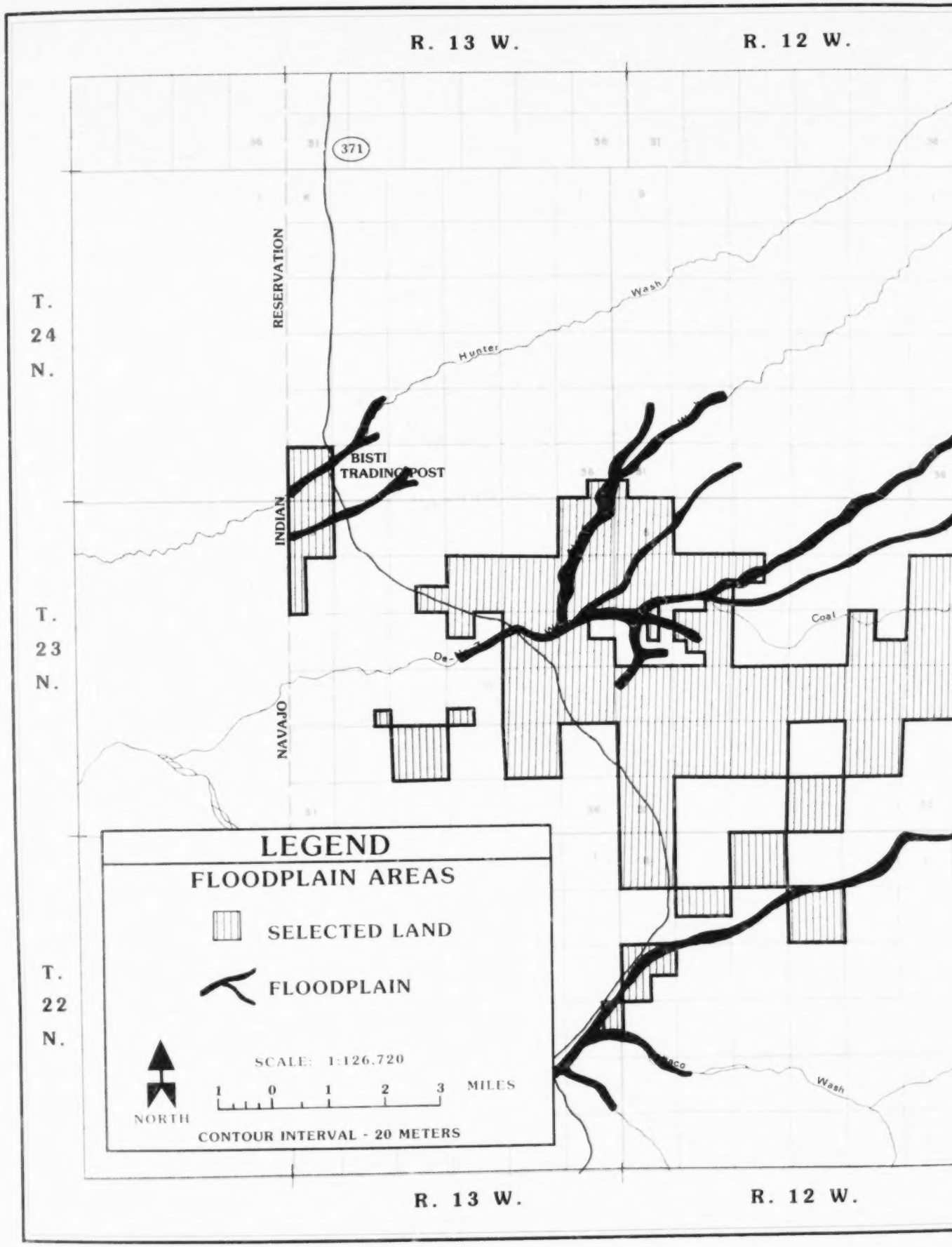
Source: U.S. Dept. of Housing and Urban Development, Federal Insurance Administration 1977 and 1978.

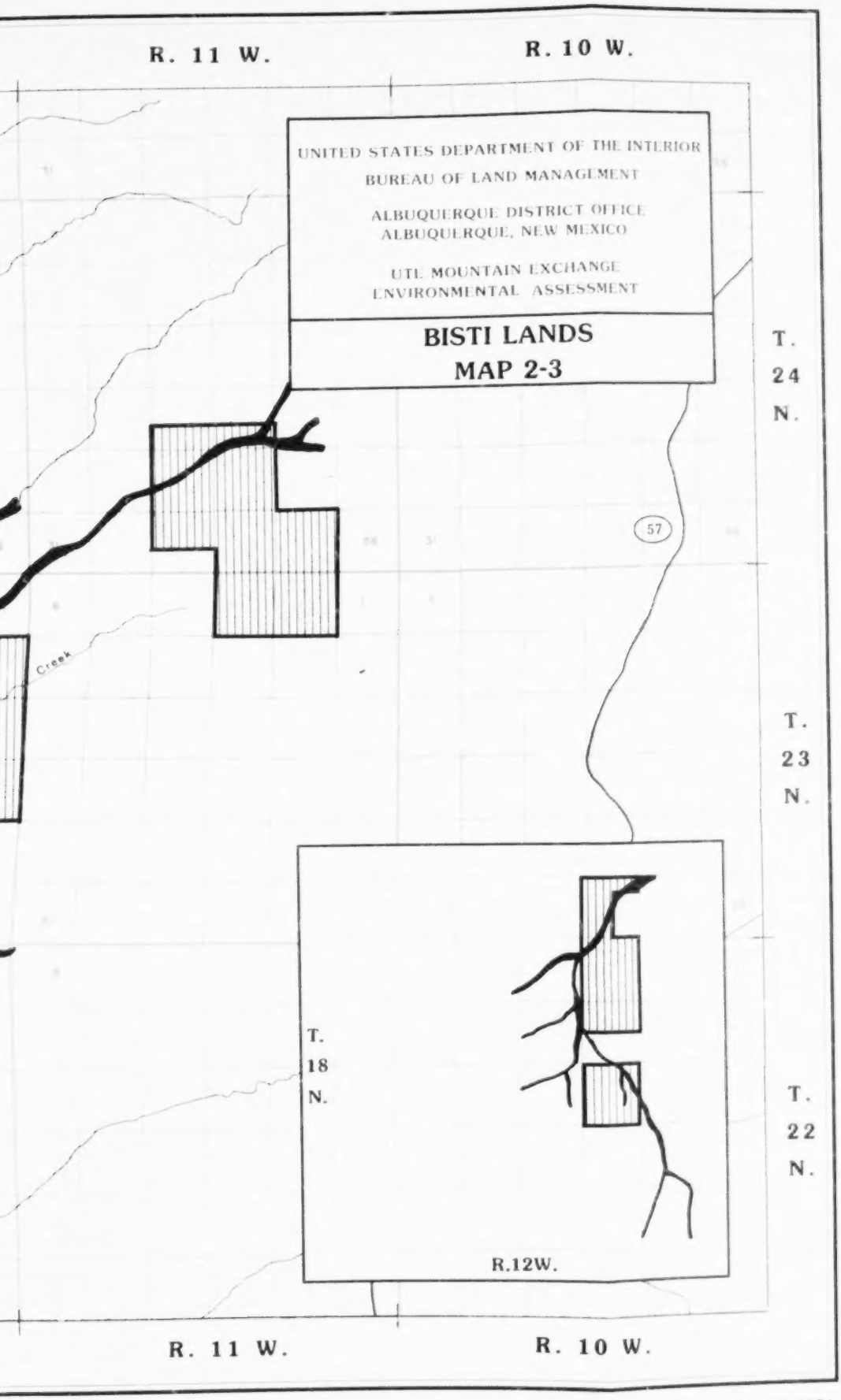
TABLE 2-6

EXISTING WELLS ON THE BISTI LANDS

Location	Name	Type of Well
T. 23 N., R. 11 W., Sec. 2	North Pasture	BLM Stockwater Well
T. 23 N., R. 13 W., Sec. 10	Bisti No. 3	BLM Stockwater Well
T. 18 N., R. 12 W., Sec. 11	Jacob's Well	BLM Stockwater Well
T. 23 N., R. 12 W., Sec. 23	Ashcroft Northeast	BLM Stockwater Well
T. 22 N., R. 13 W., Sec. 24	Tsaya Spring Site	Abandoned
T. 23 N., R. 12 W., Sec. 6	AMW 6-1 Coal Well	USGS Observation Well
T. 23 N., R. 12 W., Sec. 7	TL-7-2 Coal Well	USGS Observation Well
T. 23 N., R. 12 W., Sec. 7	Bisti DH 3 Well	USGS Observation Well
T. 23 N., R. 12 W., Sec. 8	TL-8-1	USGS Observation Well
T. 23 N., R. 12 W., Sec. 8	Bisti DH-7	USGS Observation Well
T. 23 N., R. 12 W., Sec. 17	Bisti DH-5	USGS Observation Well
T. 23 N., R. 13 W., Sec. 1	A-1	PNM Observation Well
T. 23 N., R. 13 W., Sec. 12	A-2	PNM Observation Well
T. 23 N., R. 13 W., Sec. 12	A-3	PNM Observation Well
T. 23 N., R. 13 W., Sec. 14	A-4	PNM Observation Well
T. 23 N., R. 13 W., Sec. 14	A-5	PNM Observation Well
T. 23 N., R. 13 W., Sec. 14	A-6	PNM Observation Well
T. 23 N., R. 13 W., Sec. 12	A-7	PNM Observation Well
T. 23 N., R. 13 W., Sec. 1	PC-1	PNM Observation Well
T. 23 N., R. 13 W., Sec. 10	PC-2	PNM Observation Well

Source: Geohydrology Associates, Inc. 1980.


R. 13 W.
R. 12 W.
371
RESERVATION
INDIAN
T. 24 N.
T. 23 N.
T. 22 N.
Wash
Hunter
BISTI
TRADING POST
NAVAJO
Coal
Wash
LEGEND
FLOODPLAIN AREAS
SELECTED LAND
FLOODPLAIN
SCALE: 1:126,720
1 0 1 2 3 MILES
NORTH
CONTOUR INTERVAL - 20 METERS
R. 13 W.
R. 12 W.


R. 11 W.
R. 10 W.
UNITED STATES DEPARTMENT OF THE INTERIOR
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UTE MOUNTAIN EXCHANGE
ENVIRONMENTAL ASSESSMENT
BISTI LANDS
MAP 2-3
T. 24 N.
57
Creek
T. 23 N.
T. 18 N.
T. 22 N.
R.12W.
R. 11 W.
R. 10 W.

March 1981

acquired title to the wells through Section 4 permits (refer to the Glossary). The Ashcroft Northeast well was drilled in 1966 at a cost to the permittee of $1,000, and the North Pasture well was drilled in 1967 at a cost to the permittee of $19,386.

The quality of ground water in the area ranges from fair to poor. Nevertheless, because it is the only water available, it is widely used for stock and domestic purposes. Data on ground water quality of the Bisti Lands is on file at the BLM Albuquerque District Office.

Ute Mountain Lands

The Ute Mountain Lands are located in the Upper Rio Grande drainage basin. The principal surface water resource in this basin is the Rio Grande. Other than the Rio Grande, no perennial streams exist on the exchange lands.

The lower reaches of Costilla Creek drain the northwestern part of the Ute Mountain Lands. Flows in the lower reaches of this creek are ephemeral because of channel seepage and upstream irrigation diversions.

Numerous ephemeral washes that flow into the Rio Grande drain the remainder of the Ute Mountain Lands. Annual average runoff varies from 0.1 to 0.5 inches per year with the highest runoff occurring from Ute Mountain itself (USDA 1975). Sediment yield (erosion rate) varies from 0.2 to 1.0 acre-feet per square mile per year, with the lowest yield occurring in the area of Ute Mountain itself.

Streamflow in the Rio Grande is measured 6 miles above the state line near Lobatos, Colorado, at the Colorado-New Mexico state line, and about 20 miles below the state line near Cerro, New Mexico. Table 2-7 summarizes average monthly flows at the state line and Cerro gages. The table indicates that low flows can occur in the Rio Grande in September and October, particularly at the state line gage. Ground water inflow (discussed below) makes this occurrence less severe at the Cerro gage.

Although the monthly averages give some indication of a low-flow problem in the Rio Grande at the state line, they do not show the severity of the condition. USGS data from previous years show that mean daily discharge at the state line has fallen below 15 cubic feet per second (cfs) at least four times in the 1970's, and in 1956 the state line gage recorded several days of no flow at all.

Table 2-8 summarizes streamflow recorded at two locations on Costilla Creek. The lower streamgage (Costilla Creek at Garcia, Colorado) represents potential inflow to the Rio Grande. As indicated in Table 2-8, approximately 85 percent of Costilla Creek streamflow is diverted for irrigation use and only about 15 percent (average less than 5,000 acre-feet) is potential inflow to the Rio Grande. Much of this remaining streamflow is lost as seepage into the alluvium. Winograd (1959) estimated an average annual discharge of only 80 acre-feet per year from the creek to the Rio Grande during the period 1948 to 1954.

The quality of water in the Rio Grande as observed at Lobatos, Colorado, and near Cerro, New Mexico, is summarized in file material at the BLM Albuquerque District Office. A comparison of the data from the two locations

TABLE 2-7

AVERAGE MONTHLY DISCHARGE FOR THE RIO GRANDE NEAR UTE MOUNTAIN

	08252000[a]		08263500[b]	
	q[c]	Qm	q	Qm
Oct.	165	10,145	189	11,621
Nov.	327	19,458	337	20,053
Dec.	238	14,635	267	16,417
Jan.	223	13,712	258	15,864
Feb.	283	15,717	318	17,661
Mar.	370	22,751	391	24,042
Apr.	348	20,708	379	22,552
May	637	39,168	729	44,825
June	795	47,306	953	56,708
July	387	23,796	438	26,932
Aug.	200	12,297	240	14,757
Sept.	128	7,616	158	9,402
		247,311		280,835

Source: USGS 1980.

Notes: [a] 0825200 - Rio Grande at Colorado-New Mexico State Line. At River Mile - 1,713.3. Drainage Area-approx. 7,890 mi^2. Period of Record - October 1953 to current year.
[b] 08263500 - Rio Grande near Cerro, NM. At River Mile - 1,693.1. Drainage Area - approx. 8,440 mi^2. Period of Record - May 1948 to current year.
[c] q=peak daily flow, expressed in cubic feet per second. Qm=monthly total, expressed in acre-feet.

TABLE 2-8

AVERAGE MONTHLY DISCHARGE FOR COSTILLA CREEK NEAR UTE MOUNTAIN

	08255500[a]		08261000[b]	
	q[c]	Qm	q	Qm
Oct.	12.6	775	1.79	110
Nov.	9.62	572	0.0	0
Dec.	6.48	398	0.0	0
Jan.	6.38	392	0.0	0
Feb.	7.62	423	0.0	0
Mar.	13.2	812	0.0	0
Apr.	39.8	2,368	12.9	768
May	84.5	5,196	25.5	1,568
June	95.0	5,653	20.6	1,226
July	70.9	4,360	7.09	436
Aug.	58.8	3,616	3.41	210
Sept.	27.2	1,619	0.76	45
		26,183		4,362

Source: USGS 1980.

Notes: [a] 08255500 - Costilla Creek near Costilla, NM. River Mile - 15.9. Drainage Area - 195 mi^2. Period of Record - 1936 to present.
[b] 08261000 - Costilla Creek at Garcia, CO. River Mile - 13.3. Drainage Area - approx. 200 mi^2. Period of Record - June 1944 to current year; no winter records.
[c] q=peak daily flow, expressed in cubic feet per second. Qm=monthly total, expressed in acre-feet.

indicates improving water quality downstream through this segment of the river. With the exception of certain trace elements (copper, iron, and molybdenum), concentrations of dissolved constituents are lower near Cerro than at Lobatos. This is probably attributable to substantial high-quality ground water inflow. No information was found on water quality in Costilla Creek.

Ground water is abundant in the vicinity of the Ute Mountain Lands, and occurs throughout the area in the alluvial sediments and basalt flows that extend from the Sangre de Cristo Mountains to the Rio Grande Gorge. Water within the basalt is typically found at depths ranging from 90 to 230 feet below the land surface (Winograd 1959); water in the alluvial sediments is sometimes shallower.

Table 2-7 shows that annual streamflow in the Rio Grande near Cerro averages 33,500 acre-feet greater than the Rio Grande at the state line. After adjusting for maximum potential inflow from Costilla Creek, ground water inflow still accounts for an average 29,000 acre-feet per year through this segment of the river. This translates to an average 40 cfs of ground water inflow to the Rio Grande. In addition, ground water inflow accounts for an estimated 50 to 100 cfs of Rio Grande and Red River streamflow below the Cerro gage. Thus, during low flow periods (discussed above), ground water from the Ute Mountain-Sunshine Valley area accounts for the majority of streamflow in the Rio Grande.

Many wells make use of ground water from the Ute Mountain-Sunshine Valley area. Most of them are drilled into the alluvial sediments overlying the basalt. These wells are used for irrigation and are reported to yield from 600 to 1,200 gallons per minute (Winograd 1959). Utilization of ground water for irrigation occurs east and south of the Ute Mountain Lands; no ground water is currently being utilized on Ute Mountain Lands. Table 2-9 summarizes water uses and water rights for Sunshine Valley ground water.

Chemical analyses of ground water from the alluvial sediments indicate that it is among the best in the state in chemical quality. The water is well-suited for irrigation and other agricultural uses. Concentrations of total dissolved solids are reported to range from about 100 to 300 milligrams per liter (Winograd 1959). The quality of ground water found in the lava below the alluvial sediments is similar to the quality of water in the sediments themselves (Winograd 1959). Chemical quality of Sunshine Valley ground water is summarized in file material at the BLM Albuquerque District Office.

SOCIOECONOMICS

Bisti Lands

The Bisti Lands considered in this exchange are located in south-central San Juan County and north-central McKinley County. These areas are sparsely inhabited by Navajo Indian people who have lived in the area for many years, and who graze livestock as the primary source of support for their families. Additionally the area is the basis for sacred and religious activities significant to Navajo culture and lifestyle.

On or immediately adjacent to the Bisti Lands there are seven Navajo families who own homes or other developments. There are nine Navajo operators grazing livestock on four allotments and using 667 Animal Unit Months (AUMs) of

TABLE 2-9

WATER USERS AND WATER RIGHTS - UTE MOUNTAIN-SUNSHINE VALLEY GROUND WATER

Owner's Name[a]	Acreage[a]	Water Rights[a],[b] (ac-ft/yr.) Diversion	C.U.[c]	Notes[a]
C & W Gallegher	250.0	400.0	245.0	Licensed for 1.6 ac-ft/yr
Ute Mt. Farms	716.0	1,432.0	701.7	2.0 ac-ft/ac/yr (assumed)
Top O' World (South)	1,286.8	2,573.6	1,261.1	2.0 ac-ft/ac/yr (assumed)
Top O' World (North)	376.3	752.6	368.8	2.0 ac-ft/ac/yr (assumed)
Moly Corp				Offer of Judgment
a) Bert Reed Farm	475.3	950.6	465.8	2.0 ac-ft/ac/yr
b) O.P. Orr Farm	185.3	370.6	181.6	2.0 ac-ft/ac/yr
c) Anderson Farm	522.9	1,045.8	512.4	2.0 ac-ft/ac/yr
d) Tooker Farm	200.4	400.8	196.4	2.0 ac-ft/ac/yr
e) Ute Farm	400.0	800.0	392.0	2.0 ac-ft/ac/yr
f) Orr Farm	152.1	304.2	149.1	2.0 ac-ft/ac/yr
TOTALS	4,565.1	8,920.2	3,745.5	

Water Source

1. Underground
2. Water supply - generally ample. See Winograd (1959).
3. Quality - very good.
4. Diversion - wells
5. Wells drilled from 1947 through 1956. Condition generally good.

Water Use Demand

1. Crops - small grains, alfalfa, pastures, potatoes, truck crops
2. 4,565.1 acres served
3. Consumptive Use - 0.99 ac-ft/ac/yr.
4. Total C.U. demand - 3,727.0 ac-ft/yr.

Delivery Facilities

1. Field ditches direct from wells

Water Use Budget

1. 8,920.2 ac-ft/yr. - permitted diversion at wells
2. Estimated 5% lost in field ditches
3. Estimated 50% farm irrigation efficiency
4. Estimated 50% returned to aquifer

Source: Wilson, et al. 1978.

Notes: [a] Information taken from SEO Red River Hydrographic Survey, Vol. II, 1973-74, Ground Water Section. Adjudication in process. Totals subject to change; they are being used solely for estimating ground water rights in the area as a part of the overall Taos County Water survey.
[b] Water Duty - 2.0 ac-ft/ac/yr.
[c] C.U.=Consumptive Use.

forage. (Other details of livestock use on the Bisti Lands are discussed in the Livestock Grazing Section of this chapter.)

The Navajo people who live in the area believe in and live by the following philosophy: "Our God is all over - just as we point to our Mother Earth. It starts from the east to the west, and from the south to the north - just as our prayers and chants." These people gather herbs and sandstone for different ceremonies. It is important how herbs are gathered and where sandstone is obtained. The Navajos also have sacred sites and points for making religious offerings. There are gravesites scattered over some of the surrounding area that have meaning to the Navajo because of their burial customs (refer to the Cultural Resources Section of this chapter). However, no sites have been identified on the exchange lands.

Table 2-10 identifies the general location of families in the area, including the developments, and other economically and socially valued areas. These issues are also discussed in greater detail in the Draft Environmental Assessment for Coal Preference Right Leasing, New Mexico (USDI, BLM 1981).

Ute Mountain Lands

Taos County received tax revenues of $1,025 in 1980 from the owners of the Ute Mountain Lands.

LIVESTOCK GRAZING

Bisti Lands

As shown on Map 2-4, portions of seven allotments in the Chaco Planning Unit are involved in the proposed Ute Mountain Exchange (refer also to Table 2-11). The blocked areas of public lands, mixed with little or no Indian allotted lands, are currently managed by the BLM (Section 3 administration--refer to the Glossary). Two allotments in the area (Allotment Nos. 6010 and 6012), are held by Paragon Resources, a subsidiary of PNM. A third allotment (6036) is located on the Bisti South Lands and is leased to Phillips Uranium Co. (Section 15 administration).

Four other allotments (Allotment Nos. 6008, 6009, 6011 and 6016) are held by the Navajo Tribe and contain scattered tracts of public lands. They are administered by the Bureau of Indian Affairs (BIA) through a cooperative agreement dated September 15, 1978. The BLM has set carrying capacities for public lands within these four allotments. The BLM leases these allotments (Section 15 administration) to the Navajo Tribe. Because of the complex land patterns and special rules under which the BIA allotments are administered, the BLM has little knowledge of actual livestock operators, permitted numbers, class of livestock, or range developments on these allotments.

Livestock grazing has been historically, and is presently, the primary land use in the area. All allotments on the Bisti Lands are grazed yearlong, with the four BIA and/or Navajo Tribe administered allotments authorized for grazing by all classes of livestock (cattle, sheep, horses and goats). The remaining three allotments are authorized for cattle only.

Allotment number 6012 (Tsaya) is under an Allotment Management Plan (AMP) initiated in 1970. A 1975 allotment evaluation indicated a definite

Table 2-10

FACTORS DESCRIBING BISTI LANDS

Location	Withdrawal Authority	Withdrawal Purpose	Type of Developments	Acreage	Special Features	Rights-of-Way	Comments
Township 23 N., Range 13 W.							
Sec. 3, SE1/4	PLO 5721 (S-159)		Modern Type House-Small Shed-Corral	160			Borders exchange area
Sec. 10, NW1/4	Not in PLO 5721		Windmill	326.64	Bisti No. 3 BLM stock-water well, PC-2 PNM observation well	20'-Trans. NM 12221	
SW1/4	Not in PLO 5721		Trailer-Shed-Tent Structure-Corral				
Sec. 11, NW1/4	Not in PLO 5721		2 Rock Houses-Tent Structure-Wooden Shed-2 Rock Sheds-Large Corral	160			
Sec. 12, NW1/4	Not in PLO 5721		Modern Type Stone House-Livestock Shed-2 Corrals	160		A-4 PNM Observation Well, A-5 PNM Observation Well, A-6 PNM Observation Well	Hogan used for storage
SW1/4	Not in PLO 5721		Hogan-Old Corral	162.65			Hogan used for storage
Sec. 13, SE1/4	PLO 5721 (S-159)	20 yrs. Land Exch.	Hogan-Abandoned Hogan-Home-Corral	160			Intermittent seasonal occupancy
Sec. 28, SW1/4	PLO 5721 (S-159)	20 yrs. Land Exch.	Old House-Hogan-3 Shade Houses-Corral	160			

R. 13 W. R. 12 W. R. 11 W. R. 10 W.

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
ALBUQUERQUE DISTRICT OFFICE
ALBUQUERQUE, NEW MEXICO

UTE MOUNTAIN EXCHANGE
ENVIRONMENTAL ASSESSMENT

BISTI LANDS
MAP 2-4

T. 24 N.

T. 23 N.

T. 22 N.

RESERVATION

INDIAN

NAVAJO

371

57

BISTI TRADING POST

Hunter Wash

Wash

Coal Creek

De-Na-Zin Wash

Checo Wash

LEGEND

RANGE ALLOTMENTS, DEVELOPMENTS, & WELLS

- ALLOTMENT BOUNDARY
- RETENTION DAM
- USGS WELL
- PNM WELL
- CATTLEGUARD
- SELECTED LAND
- BLM WELL
- FENCE
- CORRAL
- WINDMILL

SCALE 1:126,720

1 0 1 2 3 MILES

NORTH

CONTOUR INTERVAL - 20 METERS

R. 13 W. R. 12 W. R. 11 W. R. 10 W.

March 1981

Table 2-11

BISTI LANDS ALLOTMENT INFORMATION

Allot. No.	Allot. Name	Allotment Acreage						AUM Qualifications		Admin. Status	No. of Operators[b]	Class of Livestock[c]	Season of Use	Acres Involved in Exchange	AUMs Involved (est.)[d]
		Public	Private	State	Indian Allot.	Other[a]	Total	Federal	Total						
6008	Bisti Community	9,507	40	2,155	13,598		25,300	764	Adobe Lease	Sec. 15 (BIA)[e]	24(4)	S,C, H,G	Yearlong	4,029	219
6009	Eli Smith	2,107			619		2,726	237	PLO 3662	Sec. 15 (NT-BIA)[f]	(1)	S,C, H,G	Yearlong	2,107	237
6010	Black Lake (Paragon Resources)	40,093	160	15,760	9,838		65,851	4,560	6,780	Sec. 3 (BLM)	1	C	Yearlong	6,664	585
6011	Otis Community	30,871		240	5,716		36,827	3,260	Adobe Lease	Sec. 15 (BIA)	19(2)	S,C, H,G	Yearlong	960	101
6012	Tsaya[g] (Paragon Resources)	13,208	680	2,080	5,680		21,648	1,533	1,980	Sec. 3 (BLM)	1	C	Yearlong	13,208	1,533
6016	Lake Valley Community	974		3,320	85,649	200	90,143	110	PLO 3662	Sec. 15 (BIA)	49(2)	S,C, H,G	Yearlong	974	110
6036	Jacob's Unit (Phillips Uranium Company)	2,010	1,440	4,087	480	---	8,017	264	264	Sec. 15 (BLM)	1	C	Yearlong	2,010	264
TOTALS		98,770	2,320	27,642	121,580	200	250,512							29,952	3,049

Source: USDI, BLM 1980.

Notes:
[a] National Park Service Lands
[b] Numbers taken from BIA records. Those in parentheses reflect operators actually affected by the exchange; others reflect total number of operators on the allotment.
[c] Class of Livestock: S = sheep, C = cattle, H = horses, G = goats.
[d] AUMs for allotment 6008, 6010, and 6011 were determined by compiling one year's dipping data by vegetative type. These are estimates. AUM figures for allotments 6009, 6012, 6016, and 6036 reflect total public land grazing preferences.
[e] Bureau of Indian Affairs.
[f] NT - Navajo Tribe
[g] AMP Allotment

improvement in range condition on the allotment, primarily as a result of good plant vigor and proper utilization. Range condition continues to improve on the allotment at the present time. Valid range condition and trend data on the remainder of the non-AMP allotments does not exist.

On the three community allotments (6008, 6011, 6016) within the area, the operators are individual Navajo families who run small bands of sheep and goats and who reside on or near the allotment utilized by their livestock. Range condition on many of these allotments is considered poor and in a downward trend as a result of heavy stocking rates, poor distribution, and yearlong use.

Poisonous Plants

Poisonous plants are a constant but not a serious problem. Noxious plants (e.g., tansy mustard, black greasewood) are distributed throughout the area with few areas of concentration.

Existing Developments

Known existing developments are shown on Map 2-4 and Table 2-12. They include 4 wells, 10 reservoirs, 1 corral, 5.3 miles of fence, and 2 cattleguards. This list of developments is probably not complete, particularly on the four allotments not administered by the BLM. More detailed information for these four allotments is not available.

Ute Mountain Lands

Presently, there is very limited livestock use in the area. An unknown, limited number of cattle drift into the northwestern corner of the Ute Mountain Lands from Colorado. Also, some seasonal (winter) sheep use occurs along the western edge of the area at the state line. Past livestock use has been heavy on the more level areas, but specific information on season of use or class and number of livestock is not available. Grazing has been light to none in the pinyon-juniper type of vegetation.

The Soil Conservation Service (SCS) inventory of November, 1980 indicates that a total of 982 AUMs are currently available for livestock grazing.

Poisonous plants are not frequent. Known species that occur are pinque and milkvetch.

There are no known existing range developments on the area, except that a portion of the boundary is fenced.

CULTURAL RESOURCES

Bisti Lands

Archeological Sites

Cultural resources inventories have been completed on 9,432 acres of the Bisti Lands (refer to Appendix E.) Some acreage has been inventoried for the cultural resources clearances required for mineral exploration.

TABLE 2-12

EXISTING DEVELOPMENTS ON BISTI LANDS [a]

Allot. Numbers	Job Numbers	Job Name	Units of Measurement	Funding		Maintenance Responsibility	Year Completed	Remarks
				BLM	Range User			
6008	1685	Bisti Well No. 3	1	7,791	——	Range User	1964	
6009	4129	Eli Smith Reservoir	3,880 cu. yd.	——	1,010	Range User	1970	
6010	2972	Willcoxson Corral	1	——	10,000	Range User	1966	
6010	1154	North Pasture Well	1	——	19,386	Range User	1967	
6012	4121	Ashcroft Reservoir	3,600 cu. yd.	——	525	Range User	1969	
6012	4016	Ashcroft Pit	5,310 cu. yd.	1,977	——	BLM	1969	
6012	4017	Ashcroft Pit	5,740 cu. yd.	1,977	——	BLM	1969	
6012	4019	Ashcroft Pit	5,740 cu. yd.	1,977	——	BLM	1969	
6012	4020	Ashcroft Pit	5,740 cu. yd.	1,977	——	BLM	1969	
6012	4021	Ashcroft Pit	5,740 cu. yd.	1,977	——	BLM	1969	
6012	4022	Ashcroft Pit	3,665 cu. yd.	1,466	——	BLM	1969	
6012	2948	Ashcroft Well	1	——	1,000	Range User	1966	
6012	None	Ashcroft Reservoir	[b]	[b]	[b]	Range User	1933	Base Water
6012	None	Ashcroft Reservoir	[b]	[b]	[b]	Range User	1932	Base Water
6012	3559	Ashcroft Fence and cattleguards	5.3 miles 2	6,885	——	Range User	1970	
6036	1053	Jacobs Boundary Fence	3.5 miles	——	1,750	Range User	1949	
6036	1741	Willcoxson Fence	1.0 mile	——	800	Range User	1940	
6035	1747	Jacobs Well	1	——	23,400	Range User	1965	
		TOTALS		26,027	69,346			

Notes: [a] These developments are shown on Map 2-4. Developments not included in this table are known to exist but more detailed information is not available.
[b] Data not available.

BLM site files for these clearances contain records of 234 sites and 197 isolated artifacts on the Bisti Lands. Twenty-two sites have two components and one has three components. Because these components represent separate occupations by different cultural groups, each component has been tabulated separately on Table 2-13. This table identifies the cultural/temporal affiliation of 258 known site components and isolated artifacts. No evidence of Paleoindian or Spanish presence was found on inventoried areas.

Archaic sites account for 41 percent of known sites, the largest single category on the Bisti Lands. It is probable that the majority of lithic sites on the Bisti Lands are actual Archaic. If lithic and Archaic categories are combined, they represent 57 percent of the total known sites.

Anasazi sites represent 7 percent of the known sites on the Bisti Lands. The comparatively low Anasazi site density on the Bisti Lands reflects the clustering of agricultural villages that occurred along the more reliable sources of water in the area, such as the Chaco River.

The best known Anasazi sites are the multistory pueblos within the Chaco Culture National Historical Park. More than 70 outlying communities or "outliers" are part of this complex system (USDI, BLM 1980a). Thirty-three of the outliers have been singled out as Chacoan Archeological Protection Sites, and the National Park Service, Bureau of Land Management and Bureau of Indian Affairs are now in the process of developing a special protection plan for them. Two of them, Pierre's Ruin and Lake Valley, are adjacent to or near the Bisti Lands. Both of these outliers are on the State Register of Historic Places and have been nominated to the National Register.

The BLM holds surface ownership for 640 acres of Pierre's Ruin. A Cultural Resources Interim Management Plan has been developed by the BLM for protection of the site on public land (USDI, BLM 1980b).

The Chacoan outliers are thought to have been connected with the communities in Chaco Canyon by a prehistoric road system. Much of the area to the north of Chaco Canyon has not been examined for evidence of this prehistoric road system. Obenauf (1980) has transferred segments of Chacoan roads from aerial photos to 7.5 minute USGS topographic quads. If the imaged segments on the quads are projected along their apparent trajectories, some segments could extend across the Bisti Lands. It is possible that as many as three roads, totaling approximately 18.8 kilometers (11.67 miles), could cross the Bisti Lands. The BLM has undertaken the Chacoan Roads Project to study the possible existence of unidentified roads in areas of potential energy development.

In addition to the Anasazi and Archaic archeological resources already discussed, there is evidence of historic Navajo occupation on the Bisti Lands. Navajo sites constitute 28 percent of the known sites. Most of the historic undifferentiated sites may also be Navajo. If this assumption is valid, Navajo sites would total 36 percent of the known sites.

State and National Register Sites

There are no sites on or determined to be eligible for nomination to the State or National Registers of Historic Places. The BLM will consult with the State Historic Preservation Officer (SHPO) to determine whether any known sites may be eligible for the registers. It is believed that some sites on the

TABLE 2-13

ARCHEOLOGICAL RESOURCES ON THE BISTI LANDS

Cultural/Temporal Affiliation	Known Sites Components	Isolated Artifacts
Lithic Undifferentiated	39	77
Archaic Undifferentiated	102	29
Jay (5500-4800 B.C.)	0	0
Bajada (4800-3200 B.C.)	2	0
San Jose (3200-1800 B.C.)	1	0
Armijo (1800-800 B.C.)	0	2
En Medio (800 B.C.-A.D. 400)	2	0
Anasazi Undifferentiated	5	4
Basketmaker III (A.D. 450-750)	1	0
Basketmaker III-Pueblo I (A.D. 450-850)	1	0
Pueblo I (A.D. 750-850)	0	0
Pueblo I-Pueblo II (A.D. 750-1000)	0	1
Pueblo II (A.D. 850-1000)	8	0
Pueblo II-Pueblo III (A.D. 850-1350)	3	1
Pueblo III (A.D. 1000-1350)	0	0
Navajo Undifferentiated	21	22
Early Agricultural/Post Bosque Redondo (A.D. 1500-1881)	0	0
Trading Post (A.D. 1881-1933)	22	0
Trading Post-Modern Transitional (A.D. 1881-1950)	3	0
Trading Post-Modern Navajo (A.D. 1881-Present)	2	0
Modern Transitional (A.D. 1933-1950)	10	0
Modern Transitional-Modern Navajo (A.D. 1933-Present)	1	0
Modern Navajo (A.D. 1950-Present)	13	0
Anglo Undifferentiated	1	0
Historic Undifferentiated	21	61
TOTALS	258	197

Source: BLM Albuquerque District Archeological Site Files

Bisti Lands will meet the eligibility criteria. Among these are an Archaic hunting base camp containing more than 1,000 artifacts, a Basketmaker II base camp with associated hearths and grinding stones, and a dune-covered Pueblo II-Pueblo III habitation site with neighboring fields. Potentially eligible historic sites include a petroglyph of a standing crane said to have been made by a Ute raiding party, and a battle ground where many Navajos are believed to have been killed. A 1920's fossil hunting camp may meet the criteria for local or regional significance. The site of the Tiz-na-tzin Trading Post, one of the oldest trading posts on the reservation, is approximately a mile from the Bisti Lands (York, 1981).

A 10 percent sample inventory currently being carried out for the BLM by the ESCA-Tech Corporation of Costa Mesa, California may yield information on other potentially register-eligible sites. The study area for this project overlaps the majority of the Bisti Lands.

Gravesites

No systematic search for gravesites has been made on the Bisti Lands. Ten apparent gravesites were recorded during archeological inventories. These sites were tentatively identified as historic Navajo. The Bisti Lands also contain prehistoric Anasazi and Archaic burials.

Sacred Sites

No sites of major ceremonial significance to the Navajo or other tribes are known to occur on the Bisti Lands. However, the area could contain offering points and gathering areas that have sacred qualities for one or more traditional religious practitioners.

Ute Mountain Lands

Very little is known about the cultural resources of this area. No systematic cultural survey has ever been conducted on or close to the Ute Mountain Lands. A two-day limited field reconnaissance was conducted by PNM in October of 1979 to provide a preliminary assessment of the types of cultural resources that are present in the area. No systematic sampling was attempted during this reconnaissance. The following information on this reconnaissance comes from the report prepared by PNM on the proposed Top O' the World Exchange Lands (PNM, 1979).

Seven sites were identified during this reconnaissance. Two of these are undiagnostic lithic scatters, and a third appears to be a late prehistoric or early historic habitation site. Certain features of this site are similar to Navajo hogan bases, but the site may reflect Apachean, Ute, plains or northern tribes origin. It may be eligible for nomination to the National Register of Historic Places on the basis of its potential for scientific data.

The four remaining identified sites are historic. One of these is a site dating between 1900 and 1925 that is probably associated with the heavy logging believed to have occurred on Ute Mountain during this period. The other three historic sites are sheep herding facilities dating between 1900 and 1930.

The cultural resources identified during the reconnaissance represent a variety of cultural adaptations that are poorly understood at present. The

area has the potential for evidence of a 10,000-year range of human activity. The probable predominant site type is isolated artifacts and light scatters associated with hunting and butchering from the Paleoindian period through the late 19th century. Archaic activity in the area seems certain. No extensive lithic sites have been found, but definable evidence of Archaic activity might be revealed in a systematic survey. No evidence of Puebloan occupation has been found, and any activity in the area may have been transient. Historic period sites appear to be well-represented. There are no properties on or near the Ute Mountain Lands currently listed on the National or State Registers of Historic Places.

WILDERNESS

Inventory Units NM-010-57, Bisti; NM-010-09, Ah-shi-sle-pah; and NM-010-04, De-na-zin, meet all the requirements necessary for Wilderness Study Areas (WSAs). They exhibit the fundamental wilderness characteristics of size, naturalness, and the opportunity for solitude and for primitive and unconfined recreation. In addition, supplemental values (scenic, scientific, and educational) enhance the basic WSA characteristics. Map 2-5 shows the location of the three WSAs and the exchange lands. (Detailed descriptions of the WSAs' wilderness characteristics, inventory reports and maps, and legal descriptions are available upon request from the BLM Albuquerque District Office. Large-scale overlays and topographic maps for each area are in the permanent file for each WSA.)

The southern portion of the Bisti WSA is contiguous with the northern portion of the Bisti Exchange Lands in T. 23 N., R. 13 W. The De-na-zin WSA is located approximately one mile northeast of the Bisti Exchange Lands, and the Ah-shi-sle-pah WSA is located approximately six miles southeast of the Bisti Exchange Lands.

The geology of the WSAs is composed of the Fruitland/Kirtland Formation, which consists of "alternating layers of sandstones and gray, tan and olive variegated shales" (Kues, et al. 1977). Outcrops of the Fruitland/Kirtland Formation are exposed as badlands and characterized by highly rugged terrain. These outcrops take the form of spires, towers, and "mushroom" formations. The geology of the De-na-zin WSA differs from the other two WSAs because of the presence of the Ojo Alamo Sandstone, which forms intermittent sandstone bluffs.

The paleontological values of the WSAs are well-documented in the BLM Report entitled Paleontological Survey, Resource Assessment, and Mitigation Plan for the Bisti-Star Lake Area, Northwest New Mexico (Kues, et al. 1977). Briefly, the three WSAs contain fossils of all kinds, including large dinosaur bones and articulated dinosaur skeletons. Vertebrates include turtles, crocodiles, fish remains and early mammals. Invertebrates consist of freshwater bivalves, gastropods, and gar scales. There are also concentrations of plant leaf and branch remains and petrified wood, including stumps and large logs. A transition zone limited to the De-na-zin WSA is one of the few places in the world where one can document the extinction of the dinosaur. The scientific and paleontological values in this zone extend the geographical range of plants, vertebrates, and invertebrates, and exhibit a community of life forms that coexisted during the Cretaceous Age.

RECREATION

Bisti Lands

The primary recreational opportunities on the Bisti Lands are categorized as dispersed recreation (non-consumptive) (refer to the Glossary). Examples of activities falling into this category and provided by the Bisti Lands include: sightseeing (geological, zoological, and paleontological), off-road vehicle use, hiking, rock collecting, and (occasionally) horseback riding. Other forms of dispersed recreation such as hunting, camping, and picnicking were not identified in the BLM's land use planning documents for the Chaco Planning Unit as occurring on the Bisti Lands.

The estimated 1980 demand for selected recreation activities in the Chaco Planning Unit is listed in Table 2-14. The exact use and potential demand statistics for the Bisti Lands are not available.

Two specific sites, the Fossil Forest and Tanner Lake Way Station, comprise the only known exception to dispersed recreation opportunities on the Bisti Lands. The Fossil Forest is discussed in the Paleontology section of this chapter. Tanner Lake Way Station (T. 23 N., R. 12 W., Sec. 18, $NE^1/4$) is a composite of three structures thought to be facilities associated with a Navajo trading post. Two of these structures appear to be sandstone/adobe dwellings, and the third a large corral and holding pens. All structures are in need of repair and stabilization.

The Bisti, Ah-shi-sle-pah, and De-na-zin areas are potential Areas of Critical Environmental Concern (ACECs) for recreation. The boundaries of these ACECs correspond to the boundaries of the proposed Wilderness Study Areas. A smaller portion of the proposed Bisti ACEC and designated Wilderness Study Area has also been recommended for inclusion in the National Registry of Natural Landmarks. This portion of the Bisti ACEC includes: T. 23 N., R. 13 W., Sec. 3, $N^1/2N^1/2$, and Sec. 4, $N^1/2NE^1/4$; T. 24 N., R. 13 W., Sec. 28, $S^1/2$, Sec. 33, $N^1/2$, $SE^1/4$, and Sec. 34, $W^1/2$, $SE^1/4$, for a total of 1,520 acres. This area contains the most notable land formations found in these three ACECs.

Ute Mountain Lands

Access to the Ute Mountain Lands is presently controlled by the co-owners, PNM and Franklin. This limits recreational opportunities for the public. Therefore, a true representation of potential or actual recreation demand has not yet been measured. Observations by BLM personnel during the 1979-80 field season indicate that the area does possess inherent recreational opportunities. These would be available to the recreationist should the land come under public ownership.

Visitor use of the Rio Grande has steadily grown since the first records were kept in April 1975 (refer to Table 2-15). Actual user day figures for that portion of the river passing through the exchange lands are found in Table 2-16.

The opportunity for big and small game hunting exists on and near Ute Mountain. A herd of antelope and a wintering herd of approximately 40 elk have

R. 13 W. R. 12 W. R. 11 W. R. 10 W.

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
ALBUQUERQUE DISTRICT OFFICE
ALBUQUERQUE, NEW MEXICO

UTE MOUNTAIN EXCHANGE
ENVIRONMENTAL ASSESSMENT

BISTI LANDS
MAP 2-5

T. 24 N.

T. 23 N.

T. 22 N.

371

57

RESERVATION

INDIAN

NAVAJO

BISTI TRADING POST

Hunter Wash

Alamo Wash

Cos Creek

Da Na Zin Wash

Chaco Wash

LEGEND

WILDERNESS STUDY AREAS

WILDERNESS STUDY AREA

SELECTED LAND

SCALE 1:126,720

1 0 1 2 3 MILES

NORTH

March 1981

TABLE 2-14

ESTIMATED DEMAND FOR SELECTED RECREATION ACTIVITIES
IN THE CHACO PLANNING UNIT - 1980

Activity	Activity Occasions[a]	
	Total in Planning Unit	Total on Public Lands
Visiting cultural sites	34,537	9,923
Sightseeing	89,299	23,763
Backpacking/Hiking	6,454	2,218
Recreational vehicle use	30,837	6,568
Horseback riding	285,929	56,733
Photography/Painting	98,313	26,529
Rock collecting	32,001	9,569

Source: New Mexico State Planning Office 1976 (figures prorated for Planning Unit).

Note: [a] Activity Occasions - this unit is defined as one person participating in one recreation activity during 12 or more hours of one day.

TABLE 2-15

VISITOR USE AT THE RIO GRANDE WILD AND SCENIC RIVER
RECREATION VISITORS CENTER (Visitor Days)

Year	April	May	June	July	August	Sept	Total
1975	214	325	501	928	864	319	3,151
1976	488	740	1,216	2,680	2,132	712	7,968
1977	632	1,092	2,684	4,740	3,520	1,064	13,732
1978	825	1,106	2,945	5,214	4,162	1,291	15,543
1979	689	945	2,807	4,912	4,068	1,555	14,976
1980	521	1,467	3,115	4,890	4,230	1,816	16,039

Source: BLM calculations 1981.

TABLE 2-16

PERMITTED USE ON THE RIO GRANDE WILD AND SCENIC RIVER
FOR THE 1979 SEASON

	Private User Days	%	Commercial User Days	%	Section Total User Days
Upper Box	219	38	357	62	576
Lower Box	1,465	41	2,092	59	3,557
TOTALS	1,684	41	2,449	59	4,133

Source: USDI, BLM 1980c.

been identified as occurring near the mountain. Backpacking, the scenic values of the Rio Grande Gorge, and scattered unstabilized archaeological ruins are also present. A primitive hiking trail has been developed by river runners who exit the gorge prior to moving downstream. Because of the remoteness of the area and the quantity of snow that accumulates during the winter months, this area could be used by cross-country skiers.

The only developed and intensively managed facility in the immediate area is a 1,200-acre BLM recreation site located approximately 14 miles due south of the Ute Mountain Lands. This facility provides 47 camping and day use sites, 28 trailer camp spaces, and a visitor center. While this site may be considered to be some distance from the exchange lands, topographic characteristics and the prominence of Ute Mountain itself contribute to visitor experience at the Rio Grande Gorge recreation site.

WILDLIFE

Bisti Lands

Listed Wildlife Species

There are three federal and state listed species whose presence is likely but has not been verified on the Bisti Lands: the bald eagle (endangered/State Group II), the peregrine falcon (endangered/State Group I), and the black-footed ferret (endangered/State Group I). (Refer to the Glossary for a discussion of the state listing.)

Wetland-Riparian Habitat

Available information on the wetland-riparian habitat of the Bisti lands is inadequate. It is anticipated that there are few if any wetland-riparian areas on the Bisti Lands.

Comprehensive Resource Management

The Bisti Lands are south of the boundary of the Farmington Antelope Herd Unit designated by the New Mexico Department of Game and Fish (NMDGF). None of the Bisti Lands occur within what the NMDGF officially calls occupied antelope range (NMDGF 1978), but BLM Farmington Resource Area personnel have seen antelope in the general area. No other big game animals covered by the NMDGF Operational Plan are anticipated on the Bisti Lands.

Habitat Diversity

The level of analysis in this section is the biome. This level was chosen because the best data source available, which puts the Bisti and Ute Mountain lands on an equal footing, is compiled at the biome level. This information comes from the U.S. Forest Service (1978, 1980). The terminology and numbering system from these two Forest Service sources have been retained to facilitate return to them as needed.

The Bisti Lands are within the plains grasslands biome (Run Wild Identification No. 422.000 USFS 1980). Information from the Chaco Planning Unit URA (USDI, BLM 1980c) shows that sagebrush, pinyon-juniper, grasslands and badlands tend to make up the major vegetative habitat types on the Bisti Lands.

The topographic diversity in habitat on the Bisti Lands is limited. It consists primarily of open, flat to rolling plains.

Species Diversity

The vertebrate animals on the Bisti Lands fall into four major groups: amphibians, birds, mammals, and reptiles. There are about 6 species of amphibians, 72 species of birds, no fish, 34 species of mammals, and 12 species of reptiles. (File material at the BLM Albuquerque District Office contains a complete listing of species and further information on species diversity.)

Ute Mountain Lands

Listed Wildlife Species

Three federal and state listed species on the Bisti lands are also listed for Ute Mountain Lands. Three additional state-listed species also probably occur: the western toad (Group II), the marten (Group II), and mink (Group II).

Wetland-Riparian Habitat

The Rio Grande Gorge is the only known wetland-riparian area on the Ute Mountain Lands. No perennial streams or springs are known on the Ute Mountain Lands, but there may be seepages in the Rio Grande Gorge. Because of the annual scouring of high water there is little riparian vegetation buildup in the gorge. There are some tamarisk and willows along the river edge (PNM, 1979).

Comprehensive Resource Management

Less than 1 percent of the Ute Mountain Lands occur in each of the NMDGF herd units in the area. (the Sangre de Cristo Deer Herd Unit, the Maxwell Elk Herd Unit, and the Tres Piedras Antelope Herd Unit.) (Maps showing these herd units can be found in the 1978 NMDGF publication.)

The Rio Grande Gorge may or may not isolate the antelope south of Ute Mountain from the main herd area in Punche Valley. A recent field observation made by the BLM Taos Area wildlife biologist suggests there is a slight possibility that there is antelope movement across the Rio Grande Gorge in the area of Ute Mountain. A local rancher has also seen antelope crossing the river.

Habitat Diversity

The Ute Mountain Lands contain elements of four biomes (USFS, 1980): petran subalpine conifer forest and woodland (Run Wild Identification No. 211.000); Great Basin conifer woodland (Run Wild Identification No. 224.000); plains grassland (Run Wild Identification No. 422.000) and Great Basin desert scrub (Run Wild Identification No. 521.000).

The Ute Mountain Lands provide a great deal of topographic diversity. The major elements of this diversity are: the Rio Grande Gorge, the sloping plains at the foot of Ute Mountain, the height of the mountain above the surrounding plain, and the north- and south-facing slopes of the mountain.

Species Diversity

The vertebrate animals on the Ute Mountain Lands fall into five major groups: amphibians, birds, fish, mammals, and reptiles. It is estimated that there are about 7 species of amphibians, 172 species of birds, 13 species of fish, 60 species of mammals, and 16 species of reptiles.

LAND USES

Right-of-Way Grants

The right-of-way grants listed in Table 2-17 are for structures located on the Bisti Lands.

Navajo Families

On April 12, 1978 a field inspection was conducted on the Bisti Lands; seven Navajo families are located on the area. The BLM's land status plats are presently noted with NM-32341 (Indian Exchange Application) and NM-31869 (Indian Withdrawal Application). The Indian Exchange Application is still pending, but it does not place any restrictions on the parcels involved. NM-31869 was a 2-year withdrawal that expired on January 12, 1979.

On January 19, 1981 legislation was introduced in the Senate (S-159) to finalize a proposed land exchange with the Navajo Tribe. This legislation includes the first three parcels listed in Table 2-10 of the Socioeconomics section of this chapter. These parcels were withdrawn in May 1980 under P.L.O. 5721 for 20 years or until the Navajo Exchange is finalized.

VISUAL RESOURCES

Bisti Lands

The 29,952 acres of the Bisti Lands, located within six different BLM identified Scenic Quality Rating Units (SQRUs) are shown on Map 2-6. (Refer to the Glossary and to Appendices F-1 and F-2 for further explanation of scenic quality rating.) A majority of the Bisti Lands or approximately 27,072 acres are within SQRUs 004, 007, and 010, which have been identified as having Class C scenery (of low scenic value).

The Class B scenic value areas in the Bisti Lands involve 687 acres in two rating units; one is SQRU 008, which contains steep escarpments, the other unit (003) contains irrigated farmlands and open grasslands. The prominent land feature of SQRU 008 is Chaco Canyon and its many side canyons, such as Tsaya. This type of landform offers a greater variety in surface relief and coloration than the Class C scenery that surrounds it. There is only a small amount of the Bisti Lands within SQRU 003; they are gently sloping open grasslands.

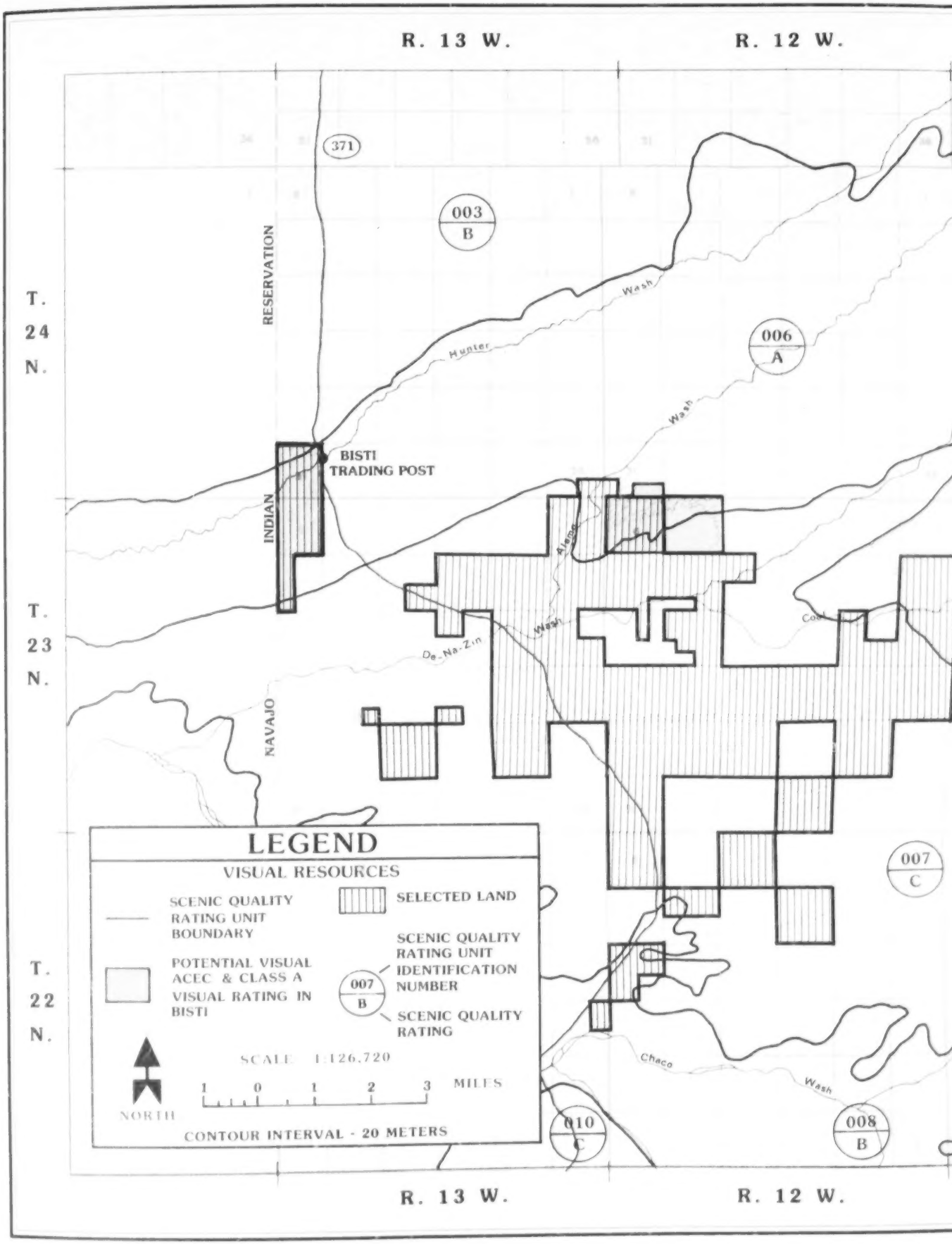
The Bisti Badlands, SQRU 006, make up the Class A scenic values. As shown on Map 2-6, 2,193 acres of the Bisti Lands extend into this unit. This extensive area of badlands consist primarily of highly eroded shale and sandstone outcrops, which are generally devoid of vegetation. These formations are striking in that they are enriched and highlighted by early morning sun,

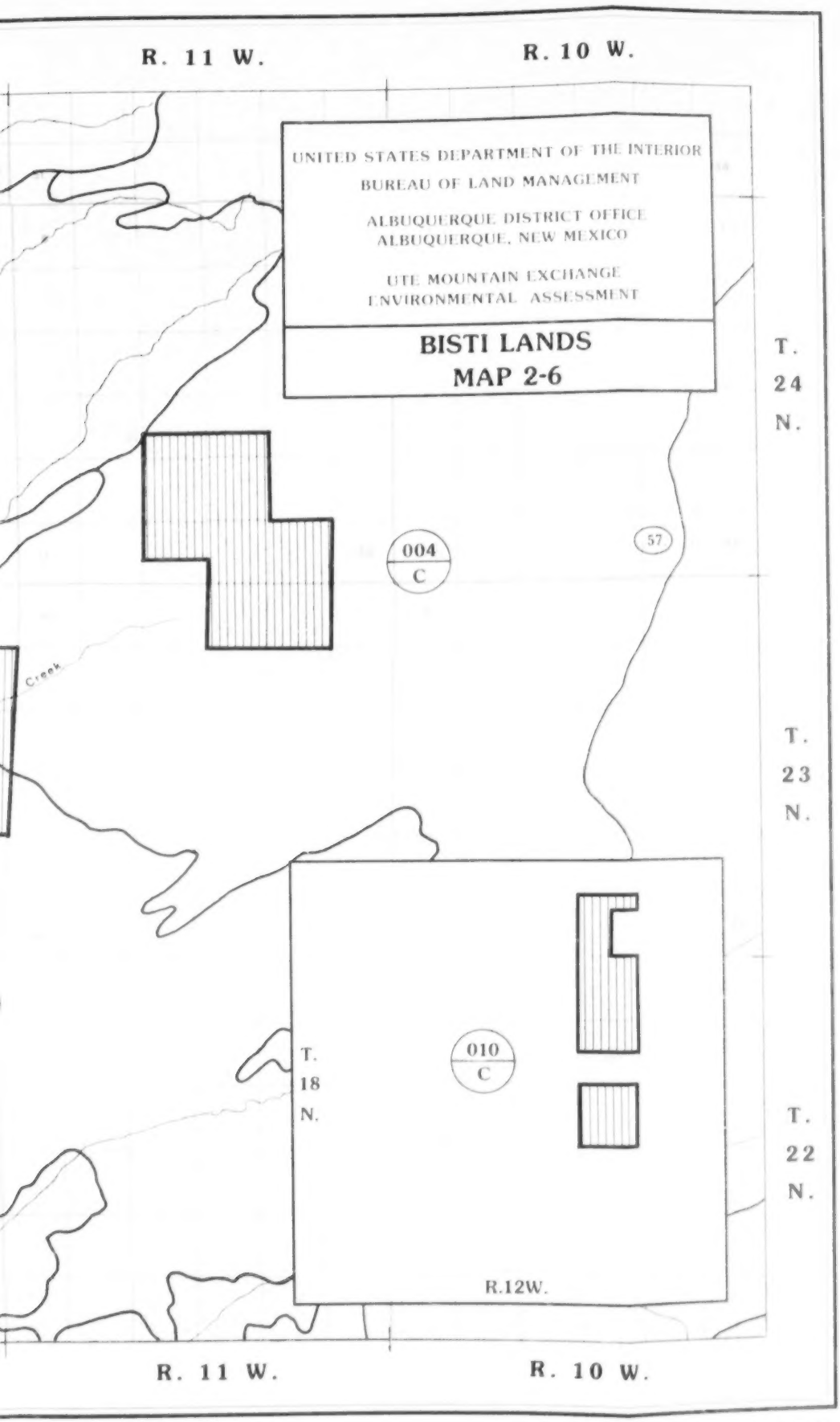
TABLE 2-17

RIGHT-OF-WAY GRANTS ON THE BISTI LANDS

Serial Number	R/W	Granted To	Date Granted	Granted For	Rental	Location
NM-3870	150-foot wide road	Bureau of Indian Affairs	August 1969	Indefinite period	—	T. 18 N., R. 12 W., Section 23
NM-12221	20-foot wide transmission line	Jemez Mountain Electric Cooperative	October 1970	50-years	—	T. 24 N., R. 13 W., Section 31 T. 23 N., R. 13 W., Sections 9, 10, 14, 23, and 24 T. 23 N., R. 12 W., Sections 30 and 31 T. 22 N., R. 12 W., Sections 6 and 18
NM-23125	20-foot wide distribution line	Jemez Mountain Electric Cooperative	March 1976	50-years	—	T. 24 N., R. 12 W., Section 31
NM-29324	200-foot wide railroad	Star Lake Railroad Company	September 1980	20-years	$1,542/ Annually	T. 23 N., R. 13 W., Sections 23 and 24 T. 23 N., R. 12 W., Sections 19, 29, and 30 T. 22 N., R. 12 W., Sections 8 and 10
NM-29482	50-foot wide road	New Mexico State Highway Dept.	February 1978	Indefinite period	—	T. 22 N., R. 12 W., Section 6
NM-30797	4 5-foot by[a]/ 5-foot groundwater observation well sites	U.S. Geological Survey	September 1977	30-years	—	T. 23 N., R. 12 W., Sections 6, 7, and 8
NM-31133 NM-31134 NM-31135	350-foot by 350-foot meteorological sites	PNM	August 1977	3-years[b]/ (option to renew)	$200/ Annually	T. 23 N., R. 13 W., Sections 10 and 24 T. 23 N., R. 12 W., Section 31
NM-40364	50-foot wide distribution line	PNM	January 1981	50-years	$150/ Annually	T. 18 N., R. 12 W., Section 14
NM-0556114	20-foot wide distribution line	Jemez Mountain Electric Cooperative	August 1965	50-years	—	T. 22 N., R. 12 W., Section 10

Notes: [a]/ Two additional USGS wells that are not under a right-of-way grant are located in T. 23 N., R. 12 W., Sections 8 and 17.
[b]/ Actions are being taken by PNM to have these right-of-way grants extended.


R. 13 W.
R. 12 W.
T. 24 N.
T. 23 N.
T. 22 N.
371
003
B
006
A
007
C
010
C
008
B
RESERVATION
INDIAN
NAVAJO
BISTI
TRADING POST
Hunter
Wash
Alamo
De-Na-Zin
Chaco
LEGEND
VISUAL RESOURCES
SCENIC QUALITY RATING UNIT BOUNDARY
POTENTIAL VISUAL ACEC & CLASS A VISUAL RATING IN BISTI
SELECTED LAND
SCENIC QUALITY RATING UNIT IDENTIFICATION NUMBER
SCENIC QUALITY RATING
SCALE 1:126,720
1 0 1 2 3 MILES
NORTH
CONTOUR INTERVAL - 20 METERS


R. 11 W.
R. 10 W.
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ALBUQUERQUE, NEW MEXICO
UTE MOUNTAIN EXCHANGE
ENVIRONMENTAL ASSESSMENT
BISTI LANDS
MAP 2-6
T. 24 N.
004
C
57
Creek
T. 23 N.
010
C
T. 18 N.
T. 22 N.
R.12W.
R. 11 W.
R. 10 W.

March 1981

sunset coloration and shadow effects. This unit is also considered to be free from aesthetically undesirable influences related to landform alterations or placement of structures on the land.

The Bisti Badlands have also been recommended for designation as an Area of Critical Environmental Concern (ACEC). The identification and recommendation of SQRU 006 as a potential ACEC has been done through the BLM's planning process. The recommendation was on the basis of the highly scenic values exhibited in the distinctive and interesting landforms, the texture of this eroded landscape, and the pastel colors of the Bisti Badlands. This area is also one of the most extensive badland areas in the San Juan Basin.

Ute Mountain Lands

The lands offered for exchange have not been officially classified. They have been divided into three landscape units: the sagebrush-grassland plain, the Rio Grande Gorge, and Ute Mountain. The scenic quality of each of these units is described in the Environmental Resource Evaluation of the Proposed Top O' the World Exchange Lands (PNM 1979), which is excerpted in Appendix F-3.

New Mexico State Highway 3 is the major travel route in the area of the Ute Mountain Lands. The 1980 traffic flow study done by the New Mexico State Highway Department indicates an average daily traffic flow of 2,110 vehicles at a point just north of Questa on State Highway 3. Ute Mountain is a focal point as people driving this road look across the plains to the west.

THREATENED OR ENDANGERED PLANTS

Bisti Lands

There are no known populations of federally listed threatened or endangered plant species on the Bisti lands. This area was surveyed by Spellenberg (1976), who found none of the species which were then proposed for listing as threatened or endangered (Federal Register, Vol. 40, No. 117, July 1, 1975; and Vol. 41, No. 127, June 16, 1976). More recently (1980) a printout of information from the New Mexico State Heritage Program shows no location of these species in the area.

The printout from the State Heritage Program lists no special interest plants as occurring on the area. However, it does show that Androstephium breviflorum and Astragalus kentrophyta var. neomexicanus occur nearby in the Chaco Culture National Historical Park. These plant species are of special interest because of their restricted ranges.

Ute Mountain Lands

There are no known populations of federally or state listed threatened or endangered plant species on the Ute Mountain Lands or in the immediate vicinity.

chapter 3

ENVIRONMENTAL CONSEQUENCES

CHAPTER 3

ENVIRONMENTAL CONSEQUENCES

ASSUMPTIONS AND ANALYSIS GUIDELINES

The conveyance of a patent for public land and fee title for private land would not cause impacts. Impacts would occur with a change in present and future ownership and management of the resources on both the Bisti and the Ute Mountain Lands. Analysis deals with impacts resulting from a loss or gain of BLM management through a land exchange. Specific actions that may occur on Bisti Lands under PNM's and Franklin's ownership and management are not discussed.

Impacts are addressed for the entire 29,952 acres of the Bisti Lands being considered for exchange. Resource components that would not be impacted by the proposed exchange or the No Action Alternative are not discussed in this chapter. In those instances where the magnitude of the impact is questioned, the worst case (loss of the resource) is assumed.

Because of limitations in the terms, convenants, conditions, and restrictions that can be included in a patent, few proposed mitigating measures are included in this chapter. The primary proposed mitigating measure applied to major impacts would be to drop affected acreage from the exchange. Impacts identified in this chapter should also be considered as residual impacts, if a mitigating measure is not proposed for an impact or selected when a decision is made on this exchange.

Because conveyance of a patent and fee title for these lands would result in a permanent change in ownership and management, only the long-term impacts on the areas and resource management programs are considered in this EA.

Even though an exchange is considered permanent, ownership and management of the lands could be returned to the government and private landowner. This action is not likely; therefore, it is considered to be irreversible. Resource components considered irretrievable are discussed in this chapter.

PALEONTOLOGY

Bisti Lands

Proposed Action

The BLM would lose control and management of paleontological resources on the Bisti Lands if the proposed land exchange takes place. The following impacts would occur:

1. A long-term scientific study of a unique Late Cretaceous biota -- the Fossil Forest -- would be terminated.

2. All fossil-collecting localities on these lands would be closed to the scientific community. This would hinder the discovery by scientists of new fossils exposed by weathering. Frequently, such new material would be lost to science because of natural deterioration.

3. Inclusion of some of the Bisti Lands (see Table 2-2 in Chapter 2) in the exchange would compromise the integrity of proposed paleontological Areas of Critical Environmental Concern (ACECs) in the Bisti.

4. Destruction of fossil occurrences on the Bisti Lands listed in Table 2-1 (Chapter 2) could occur.

5. Development of the Bisti Lands could directly impact paleontological resources on other public lands in the Bisti.

6. Closure of Bisti Lands with paleontological resources could result in an increase in vandalism and unauthorized collection of fossils from other public lands in the Bisti.

The proposed mitigating measures is to drop specific tracts of the Bisti Lands from the proposed land exchange. Those tracts recommended to be excluded are listed in Table 3-1. This table includes all of the Bisti Lands within proposed ACECs and all the lands containing critical, highly important, and important fossil occurrences.

No Action Alternative

Under this alternative, the Bisti Lands would remain in the public domain. The long-term paleontologic study of the Fossil Forest would continue. Impacts to paleontological resources brought on by natural deterioration from weathering would continue at their current rate. The current low level of unauthorized fossil collecting and vandalism would continue.

The mitigation of future impacts under this alternative would include total protection of localities; salvage through surface collecting, excavation, or bulk sediment sampling for screening; and the continued study of fossils from the Bisti Lands by professional paleontologists.

MINERALS

Bisti Lands

Leaseables

Oil and gas. There are approximately 48 oil and gas leases on the Bisti Lands. All but one is on the Bisti North Lands. Any group or individual holding a lease at the time of an exchange has prior existing rights to surface

TABLE 3-1

BISTI LANDS RECOMMENDED FOR EXCLUSION FROM THE PROPOSED LAND EXCHANGE BECAUSE OF PALEONTOLOGICAL RESOURCE VALUE

T. 23 N., R. 12 W., NMPM	Acres
Sec. 6, Lots 8-23	679.36
Sec. 13, Lots 1-16	666.65
Sec. 14, Lots 1-8, NW1/4	491.93
Sec. 17, Lots 1-13[a/]	545.02
Sec. 22, Lots 1-16[a/]	661.31
Sec. 23, Lots 1-8, S1/2	649.63
Sec. 24, Lots 1-8	650.20
Sec. 26, All	640.
Sec. 34, All	640.
T. 23 N., R. 13 W., NMPM	
Sec. 1, All	640.
Sec. 6, Lots 1-4, E1/2, E1/2W1/2	522.92
Sec. 10, Lots 1-4, N1/2, N1/2S1/2	653.36
Sec. 11, Lots 1-4, N1/2, N1/2S1/2	650.28
Sec. 12, Lots 1-4, N1/2, N1/2S1/2	643.52
T. 24 N., R. 13 W., NMPM	
Sec. 31, Lots 1-4, E1/2, E1/2W1/2	525.57
TOTAL	9,259.75

Note: [a/] These two sections are recommended to be dropped because they are Class I areas for paleontology. The remaining sections are proposed paleontology ACECs.

resources in developing the lease. The lessee would cause surface disturbances on private land in the development of leases.

Locatables

Phillips Uranium has 140 lode mining claims staked in T. 18 N., R. 12 W., Sections 2, 11, 14 and 23. This land can be exchanged.

The exchange would result in the loss of the surface estate in the development of mining claims and the opportunity to patent the surface estate of these claims by Phillips.

The proposed mitigating measure is to place a clause in the patent to reserve the prior existing right of Phillips to patent the surface estate of their mining claims. If this mitigation measure was selected, and Phillips patented the surface estate of their mining claims at a later date, up to 2,009 acres of land acquired by PNM and Franklin in the proposed exchange would be lost. If this mitigation measure is not selected, the impacts discussed above would occur. Phillips Uranium would then be required to negotiate with PNM and Franklin for use of the surface estate in developing mining claims.

Claims could still be staked on the land, because the federal minerals would remain in government control.

Saleable Minerals

The BLM can make non-competitive sales (under $5,000) and the buyer would be required to reimburse the surface owner for any surface damage. A competitive sale (over $5,000) could only be made if the surface owner agreed to grant access to any individual or group who bought the minerals.

At present, there are no saleable mineral deposits being developed on the Bisti Lands.

Access

There are several county roads in the area of the Bisti Lands. It is possible that if the surface is transferred into private ownership, the owner could seek to have some or all of these roads closed by the County Commission. Whether or not the roads were closed, little or no impact upon mineral development would occur. A claimant would have access to federal minerals whether there were roads in the area or not.

If the Bisti surface is transferred into private ownership, the public could continue to stake claims or obtain leases. Exploration and development of claims and leases would result in disturbance of the surface estate. Section 209 of FLPMA does not provide for reimbursement to the surface owner for damages due to mineral entry. Therefore, impacts occurring to private land from mining activities may not be mitigated, nor the surface owner(s) reimbursed for damages.

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Ute Mountain

Under BLM management of the surface of the Ute Mountain Lands, PNM and Franklin or A. K. McMillan would be required to comply with BLM's surface reclamation requirements during exploration or mining activities. A. K. McMillan has access to all of the Ute Mountain Lands. Surface-disturbing activities could occur along the river, even under federal ownership and management. To protect the surface estate of the land located next to the river, a mitigating measure is proposed for A. K. McMillan and BLM to negotiate a scenic easement agreement.

WATER RESOURCES

Proposed Action

Bisti Lands

The BLM would lose management opportunities for water resources on the Bisti Lands, including up to approximately 1,500 acres of designated floodplains. The proposed mitigating measure would place a restriction in the patent against construction on the floodplains. If this mitigating measure is not selected, no restrictions would be placed on the type of activity occurring on the floodplains.

Management opportunities for reducing sediment yields from the Bisti Lands would also be lost. (This area has a high sediment yield.)

Twenty wells occur on the Bisti Lands. Nine are observation wells for PNM and would require no mitigation. Six are observation (monitoring) wells used by the U.S. Geological Survey. One BLM stockwater well is abandoned (Tsaya Spring Site), and one BLM well is on an Indian allotment. Two wells are owned by Paragon Resources, and Phillips Uranium owns a well in their allotment.

The proposed mitigating measure to protect access to these wells would place a reservation in the patent to allow access to the wells by the USGS, Phillips and the Indian livestock operators. If the BLM cannot guarantee access to the BLM and Phillips stockwater wells, new water sources may be needed by the livestock operators. The BLM and Phillips would be reimbursed for stockwater developments that could not be removed from the land. (Cost and ownership of each of these wells is presented in Chapter 2.)

Ute Mountain Lands

Acquisition of the Ute Mountain Lands would not affect the water resources of the area. Management opportunities for water resources would not occur, because the existing water rights would remain with PNM, Franklin, and other private land owners. Opportunities to enhance the wild and scenic qualities of the Rio Grande through streamflow augmentation would not occur. The occasional low flows that occur in the Rio Grande north of Cerro would continue to occur, resulting in deterioration of water quality and aesthetics.

The amount of deterioration would depend on the extent to which the water level drops.

SOCIOECONOMICS

Proposed Action

Bisti Lands

The social, economic, and infrastructural dimensions of McKinley and San Juan Counties have been considered. Based on Fiscal Year 1980 figures, the payments to the counties in lieu of taxes would be reduced by approximately 71 cents per acre for each acre exchanged. The loss of grazing by public land users would also constitute an economic impact. (The details of this grazing loss are discussed in the Livestock section of this chapter.) The assignment of dollar values to grazing is complicated by the lack of data on beef or mutton production per animal unit month (AUM) of grazing and other needed data. However, the following figures give a range of estimated values.

The amount ranch operators pay for an AUM of grazing is an indication of its value. At the present, operators are paying $2.31 for an AUM of public land grazing. The average monthly rate per head for pasturing cattle on privately owned land in New Mexico was $6.70 in 1979. Using 1979 New Mexico agricultural statistics, the gross return per AUM of grazing was estimated at $16.49 (refer to Appendix G).

Two of the allotments could continue to be used by the present operator (Paragon Resources) because Paragon is a subsidiary of PNM. The other allotment (264 AUMs) is used by an operator who has other economic interests. Therefore, the economic impacts to these operators would be less severe than the impacts that would be felt by the nine Navajo operators who use the other four allotments. Their total known livestock grazing resource could be eliminated.

The BLM would lose the annual revenue from grazing permits for a portion of 3,049 AUMs. In 1981 the annual revenue amounted to approximately $7,040.

Up to $1,542 of the annual right-of-way rental on the Star Lake Railroad presently being received by the BLM would be paid to the new surface owner. Annual rental fees of $200 paid to the BLM by PNM for meteorological sites and $150 for an electrical distribution line could be terminated.

The exchange would only affect those Navajos who reside on or adjacent to the exchange lands. Visits with residents of the area were made. Eight families are living on Bisti Lands at the approximate locations indicated in Table 2-10 (Chapter 2). If they are required to move, these families would be greatly impacted socially. This would be particularly true for older persons who have spent their entire life in these locations.

A change in the surface ownership of the Bisti Lands would eliminate the federal government's ability to ensure access to sites used by the Navajo for religious and ceremonial purposes. The dollar value of herbs and sandstone used ceremonially by the Navajos has not been established because these items have been readily available for gathering. The Proposed Action could eliminate the free availability of these items. Even if they could be gathered free in other areas, there would be transportation costs.

The movement of burial sites from the exchange area would result in notable emotional impacts on the resident Navajo people.

The proposed mitigating measure for social concerns and problems would be to drop from the exchange those lands on which the Navajos live and have made developments. The economic loss of developments would also be mitigated by this action.

Ute Mountain Lands.

Economically, the county would no longer receive the tax revenue paid by Public Service Land Company (a subsidiary of PNM) of approximately $1,025 in 1980. Acreage held in federal ownership in Taos County (called Entitlement Acres brought in an average of 63 cents per acre as in-lieu tax payments for fiscal year 1980. Based on the 63 cents per acre figure, the 17,134 acres of exchange lands would generate in-lieu payments amounting to $10,794.00 at the 1980 rate. This would be a net increase in county revenue.

The residual impacts could be the change in county revenues based on payments in lieu of taxes.

LIVESTOCK

Bisti Lands

The four allotments administered by the BIA involve nine grazing operators and approximately 667 AUMs of grazing use.

The total (known) livestock operation for the nine Navajo operators would be eliminated.

Two of the three remaining allotments are leased to Paragon Resources, a subsidiary of PNM. Exchange lands in these two allotments involve approximately 2,118 AUMs, on approximately 34 percent of the total public land leased for grazing to Paragon Resources. A portion of the grazing preference on the Tsaya Allotment (1,533 AUMs) could be eliminated, and up to 13 percent (585 AUMs) of that on the Black Lake Allotment.

The other allotment is leased to Phillips Uranium. On this allotment, a total of 264 AUMs of grazing preference is currently authorized on public lands. Up to 264 AUMs on this allotment could be eliminated. (Refer to the Socioeconomics section of this chapter for dollar values of AUMs).

The proposed mitigation measure is to select other lands in the Bisti area prior to selecting any of the lands in the nine Navajo grazing operations. A concentration of lands exchanged in areas where PNM currently controls the public land grazing preference would eliminate most if not all of the impacts to the Navajo operations. Relocation of the grazing preference of Navajo operations lost because of the exchange is not possible because all public land grazing use areas in the Chaco vicinity are presently allocated for grazing.

The disposal of a portion of the public lands within an allotment could result in limiting the management of the remaining public lands in that allotment by the BLM. This statement is especially applicable to the Tsaya Allotment (6012), on which an Allotment Management Plan (AMP) was initiated in 1970.

Range development projects that could be acquired as a result of the exchange consist of a BLM well, 1 reservoir, 4.5 miles of fence, and a well leased to Phillips Uranium. The standard operating procedures is to reimburse the owner for those developments that cannot be removed from the land.

Ute Mountain Lands

If these lands come into public ownership, any grazing allowed on them would be administered under Title 43 CFR, Part 4100. The lands would be outside an existing grazing district; thus, base property for public land grazing preference would be "contiguous land, or noncontiguous land when the applicant owns or controls contiguous land" (43 CFR 4110.2-1(a)(2)).

The area is presently inadequately watered and fenced for cattle. Also, a large acreage (approximately 8,160 acres or 62 percent) is in poor condition (refer to Table 3-2). Until some of the basic facilities and developments are constructed, grazing use by cattle could not be permitted.

CULTURAL RESOURCES

Bisti Lands

Under the Proposed Action, the federal government would give up control over the cultural resources on the Bisti Lands. Existing laws requiring analysis of impacts on archeological sites before ground-disturbing activities, would no longer have to be met.

American Indian gravesites and sacred sites on the Bisti Lands would also pass from the jurisdiction of the federal government. American Indians would be excluded from sacred areas; however, the BLM lacks the data to assess the impacts upon these people. Disturbance to prehistoric and historic gravesites would be regulated by existing state law.

The proposed mitigation measures for cultural resources on lands selected in a land exchange are listed below.

TABLE 3-2

RANGE SITES, CONDITION AND PRODUCTION DATA FOR
UTE MOUNTAIN VEGETATION

Range Site	Total Acres	Condition and Production [a] Good	Fair	Poor
Pinyon-Juniper-Dense	48	—	48A 60 lb./A	—
Pinyon-Juniper-Medium	228	—	228A 185 lb./A	—
Pinyon-Juniper-Sparse	560	—	560A 250 lb./A	—
Coarse Loamy	2,424	—	—	2,424A 33 lb./A
Gravelly Loam	1,189	—	—	1,189A 45 lb./A
Loamy	692	72A 176 lb./A	440A 110 lb./A	180A 55 lb./A
Loamy Bottom	209	—	—	209A 57 lb./A
Stony Loam	367	354A 150 lb./A	13A 95 lb./A	—
Dry Loamy		22A 67 lb./A	759A 47 lb./A	—
Malpais Loam	186	—	186A 124 lb./A	—
Malpais	155	155A 96 lb./A	—	—
Dry Limy	1,301	759A 255 lb./A	542A 105 lb./A	— —
Limy	621	—	621A 129 lb./A	— —
Gravelly Fan	3,593	—	9A 48 lb./A	3,584A 24 lb./A
Breaks	560	—	131A 86 lb./A	429A 29 lb./A
Swale	145	—	—	145A 78 lb./A
Subtotal	13,059	1,362A (11%)	3,537A (27%)	8,160A (62%)
Conifer-Woodland [b]	4,075			
GRAND TOTAL	17,134			

Notes: [a] Pounds per acre is currently available production.
[b] This area was not inventoried due to steepness of slope and unsuitability.

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Archeological Sites

1. The BLM would consult with the State Historic Preservation Officer (SHPO) on the level of cultural resources inventories necessary for the uninventoried areas of public land selected in the exchange.

2. The BLM would complete consultations with the SHPO on determinations of eligibility of sites for the National Register of Historic Places.

3. The BLM would develop and implement mitigation plans in consultation with the SHPO for all National Register-eligible sites.

4. The BLM would maintain the contacts that have been established with the SHPO in regard to the ongoing Chacoan Roads Project. If evidence is found to verify that prehistoric Chacoan roads cross the public lands within the area of the proposed land exchange, appropriate mitigation measures will be developed in consultation with the SHPO.

These mitigating measures for archeological resources would result in salvaging them. The salvaging of these resources would be directly related to the time available for retrieval and the quality of professional expertise available for the retrieval effort.

Gravesites

1. The BLM would seek a Memorandum of Agreement with the Navajo Nation on procedures for the reinterment of deceased Navajo on lands belonging to the Navajo Nation.

2. The BLM would follow the procedures set out in the New Mexico State Code (Chapter 24, Article 12; and Chapter 24, Article 13, Section 1) for the disposition of unclaimed human remains.

Sacred Sites

The BLM would consult with American Indian religious practitioners to develop mitigation measures for sacred sites. The following groups have been identified in this consultation process:

1. Traditional Navajo religious practitioners living on or near the public lands within the proposed land exchange area.

2. Officials and other members of the Navajo Medicine Men's Association.

3. Tribally recognized Puebloan, Ute and Apachean religious practitioners concerned about specific sacred sites on public lands within the proposed land exchange area.

4. The Navajo Tribe, Window Rock, Arizona.

It is assumed that mitigating measures for the gravesites on the Bisti Lands would eliminate residual impacts to all identified gravesites.

WILDERNESS

Bisti Lands

The loss of federal management, if lands are selected adjacent to WSAs, could have an impact on the WSAs. The degree of impact would depend on the type of action occurring on the adjacent lands, the frequency of occurrences, and the activities' effect on the type of ecosystems represented in the WSAs. Because the nature of activities on adjacent lands cannot be determined at this time, the identification and significance of future impacts resulting from the proposed land exchange cannot be determined.

A loss of management on lands adjacent to the three WSAs could affect the BLM's ability to protect and manage the WSAs before recommendation for wilderness designation. The proposed mitigation measure is to select other lands before selecting any land located adjacent to the WSAs. If this mitigation measure is not selected, the BLM may be required to implement additional protection and management on these WSAs, particularly on lands immediately adjacent to the Bisti Lands. A shift in BLM policy, programs, and funding may not allow for an increase in the management of these areas.

Ute Mountain Lands

Acquisition of Ute Mountain by the BLM would provide the opportunity to intensively inventory the Ute Mountain region and possibly add a WSA whose ecotype is presently well-represented in the National Wilderness Preservation System.

RECREATION

Bisti Lands

The proposed exchange would result in the closing of land used by the general public. This closure would shift or displace recreation use to other federal lands in the San Juan Basin. The effect of this shift to the individual user cannot be quantified, because the current recreational use or demand for these lands has not been measured.

It is assumed that the removal of the Bisti Lands from public use would not create impacts on dispersed recreation because of the following factors:

1. The lack of knowledge by the general public of the recreational opportunities on the Bisti Lands.

2. An abundance of similar types of recreational opportunities in similar type settings on public lands located throughout the San Juan Basin.

3. The availability of more accessible lands that are more conducive to dispersed recreation in other portions of the San Juan Basin.

4. A preference by visitors to view the scenery associated with the Bisti Badlands located adjacent to the exchange lands.

Impacts would occur on those areas on the Bisti Lands that require intensive recreation management and development, i.e., Tanner Lake Way Station and the Fossil Forest. Tanner Lake Way Station is theorized to have been one of the first Navajo trading posts in this area. A transfer of the Bisti Lands would result in the loss of future study, interpretation, and stabilization of this site. Further study and research is also needed to determine whether this site would qualify for nomination to the National Register of Historic Places.

The Fossil Forest represents an assemblage of fossils exhibited in only three other locations in the world (Montana; Alberta, Canada; and Mongolia) (pers. comm. with Cole Robison, BLM, 1981). Studies are currently underway by the BLM and the New Mexico Bureau of Mines and Mineral Resources to determine the exact extent and value of these fossils. Field excavation of these fossils could afford the recreationist with the opportunity to view professional paleontologists at work. Exact visitor demand for this type of recreation is not known at this point. However, the Florissant Fossil Bed National Monument in Florissant Colorado, also situated in a remote location, received over 66,600 visitors in 1980. (Pers. comm. with Myrtle Weir, NPS March 1981.) The transfer of this type of resource to private ownership would result in the loss of this resource to the public.

The impacts and the proposed mitigation measure discussed for wilderness also apply to the potential recreation ACECs. The proposed mitigation measure for the Fossil Forest and Tanner Lake Way Station is to drop this acreage from the Ute Mountain Exchange.

Ute Mountain Lands

Mr. A. K. McMillan holds mineral interest on these lands, which allows him to develop roads and any minerals that might be located on the Ute Mountain Lands. Thus, the potential exists for impacts to recreation to occur along the river from mineral development.

Several developers have notified the BLM's Taos Resource Area staff that they are interested in developing land adjoining the river and other BLM lands. If housing developments were constructed on the upper third of Ute Mountain, they would be visible from the river. A decision on a suitable combination of future uses, including housing developments, would have to be determined in the BLM's planning system.

Acquisition of Ute Mountain would provide the BLM with management authority over recreational activity occurring along the river and primitive type recreation on Ute Mountain.

WILDLIFE

Proposed Action

Bisti Lands

Listed wildlife species. If any of the Bisti Lands are exchanged, a review of the federal listed wildlife species is required to ensure BLM's compliance with the Endangered Species Act. This would involve a Section 7 Consultation with the U.S. Fish and Wildlife Service (FWS). Consultation with the New Mexico Department of Game and Fish would be held concurrently with the FWS. Consultation would be made when a determination is made as to exactly which tracts would be exchanged.

If a habitat for a listed species was identified during clearance, the selection of tracts may have to be modified to eliminate land from the exchange.

Comprehensive resource management. The proposed mitigation measure for the loss of the antelope habitat on the Bisti Lands is to provide better water availability (e.g. rain catchments) on the remaining BLM lands, ensuring that all fencing put in on the remaining BLM lands is built to antelope specifications, and providing an adequate forage allocation. The population in the exchange area is known to be extremely low (officially, the NMDGF does not recognize the lands as occupied habitat), so an improvement in antelope production should occur if these measures are taken.

Habitat diversity. According to the map used for this assessment, the Plains Grassland Biome is abundant in northwest New Mexico (USFS 1980). The topography of the Bisti Lands is essentially open, flat to rolling plains. Therefore, the Bisti Lands have less potential for local habitat variations resulting from differences in elevation and exposure (north or south-facing slopes). The lower the variety of wildlife habitats, the lower the variety of potential wildlife species present.

Species diversity. The concept of species diversity, as used for this assessment, is based upon the definition published in Agriculture Handbook No. 553 (Thomas, 1979). For the purpose of this assessment, species diversity is defined as the number of wildlife species known or potentially occurring in an exchange area, either the Bisti Lands or the Ute Mountain Lands. Therefore, the total number and kinds of animals expected in each of the exchange lands is viewed as a relative value under species diversity.

Diversity values and management options. The Bisti Lands include habitat for approximately 21 species of wildlife not found on the Ute Mountain Lands. These species, include 2 amphibian species, 6 bird species, 10 mammal species, and 3 reptile species. The two amphibians are not listed (recovery), game, or harvest species. Two of the 10 mammal species are sometimes harvested for their fur, the kit fox and the eastern spotted skunk. The 3 reptile species are not listed or harvest species.

In summary, listed species habitat may not be lost on the Bisti Lands. Habitat, management for two furbearer/harvest species (the kit fox and Eastern spotted skunk) would be lost. Habitat management for the remaining 19 out of a total of 21 wildlife species could be lost for ecosystem maintenance species (refer to Glossary).

Ute Mountain Lands

Listed wildlife species. The bald eagle, the peregrine falcon and the black-footed ferret have potential for occurring on the Ute Mountain Lands. The bald eagle and the peregrine falcon can be realistically expected to use the Ute Mountain Lands.

Aquisition of these lands by the BLM would permit them to be managed for both bald eagles and peregrine falcons. This is particularly important with regards to these two scarce but highly mobile species, because favorably managed habitat offers the opportunity for recolonization.

Occurrence of the black-footed ferret on the Ute Mountain Lands is rather remote, but if the animal shows up, BLM management of the land would have to favor this animal.

The bald eagle, peregrine falcon and black-footed ferret are listed by the State of New Mexico in addition to their federal status. The western toad, the marten and the mink are listed by the state and have theoretical potential for occurrence on the Ute Mountain Lands. While the presence of these three species is not confirmed, the acquisition of the Ute Mountain Lands would permit the BLM to manage the lands in a manner favorable to these species.

Comprehensive resource management. The Ute Mountain Lands provide habitat for mule deer, elk, and antelope. Acquisition of these lands would permit the BLM to manage the lands for the benefit of these species. These lands contain less than 1 percent of each of the herd units for each of these species. The production of a given harvest animal species from the Ute Mountain Lands would be low when compared to those produced by the rest of its herd unit. However, the Ute Mountain Lands would have particular value for nonhunting wildlife-oriented recreation, because the potential for seeing all three big game species occurs within a relatively small geographic area. The potential for intensifying production of big game numbers on this small "blocked-up" unit of land is good; e.g. rain catchments could be constructed to provide year-round water for big game.

Because of the potentials involved, nonconsumptive management of big game for viewing would be the most practical primary objective. Management for hunter use would be secondary because this relatively small block of land does not contain large quantities of habitat for any one of these big game species.

Habitat diversity. Two of the four biomes (the petran subalpine conifer forest and woodland, and the Great Basin conifer woodland) occupy small isolated tracts on the Ute Mountain Lands. They constitute the major vegetation on Ute

Mountain itself. The plains grassland and Great Basin desert scrub biomes occupy much larger tracts of land that extend along the east side of the Rio Grande drainage. These grassland and scrub biomes occupy the relatively flat lands covered by the exchange (roughly 70 percent of the Ute Mountain Lands).

None of these biomes are particularly restricted in abundance in New Mexico, although the petran subalpine conifer appears to be the least abundant statewide (USFS, 1980). Therefore, it is desirable to have this habitat in public ownership.

Diversity values and management options. The Ute Mountain Lands include potential habitat for approximately 159 species of wildlife that are not found on the Bisti Lands. Of this number, there are 3 amphibian species, 13 fish species, 100 bird species, 36 mammal species, and 7 reptile species. Of the three amphibian species, one is a state listed species, the western toad (Group II). None of the 100 species of birds are recovery or listed species. However, 19 are harvest species and, except for the band-tailed pigeon and the common snipe, all are waterfowl. The remaining 81 birds are considered ecosystem maintenance species. The 13 fish species, are not listed or recovery species, but six are harvest species. The remaining 7 are ecosystem maintenance species. Two of the 36 mammal species are recovery or state listed species, the marten and the mink (Group II). Of the remaining 34 mammals, 13 are harvested either for their fur or their meat (usually a byproduct of sport hunting). This leaves 21 mammals that are viewed as ecosystem maintenance species. The 7 reptile species are ecosystem maintenance species.

Habitat management by the BLM for about 159 additional wildlife species could occur. Of these, 41 species would be of special social interest. Three of these are listed or recovery species and 38 are harvest species, either game animals or furbearers.

LAND USES

Bisti and Ute Mountain Lands

Any lands transferred out of federal ownership, and covered in part by the grants listed in Chapter 2 would be reserved to the United States, subject to the prior existing rights held by the grantee. Upon conveyance of any of the exchange lands, future right-of-way needs would be negotiated with the new land owners (PNM and Franklin).

Conveyance of any of the Bisti Lands to private ownership would result in the loss of rental payments to the BLM. The loss of revenue derived from the right-of-way grants would occur for both the present and future rights-of-way. (Refer to the Socioeconomics Section of this chapter for the amount of this revenue.)

Rights-of-way on Ute Mountain would be processed and granted according to BLM regulations and requirements.

Refer to the Socioeconomic Section of this chapter for analysis of impacts on Navajo families currently residing on or near the Bisti Lands.

VISUAL RESOURCES

Proposed Action

Bisti and Ute Mountain Lands

Through the exchange, the BLM could lose management authority on up to 2,193.11 acres in the highly scenic Class A lands of the Bisti area. This is a rare area in the San Juan Basin. The remaining 27,952.33 acres of the Bisti Lands are considered to be from moderate to low in scenic value and similar to other areas in the San Juan Basin.

The BLM would gain management authority over a block of land featuring these distinct landscape units. The Ute Mountain Lands have not been officially classified. However, based on the written description of these lands in Appendix F-3, the sagebrush-grassland unit is considered to have Class C scenic values, Ute Mountain is considered to have Class B scenic values and the Rio Grande Gorge is considered to have Class A scenic values. These projected classes are based on a preliminary application of the BLM scenic quality inventory and evaluation chart.

The proposed mitigating measure for the lands listed below, which are associated with Scenic Quality Rating Unit (SQRU) 006 and have a Class A rating, is to drop them from the exchange.

TABLE 3-3
BISTI LANDS TO BE DROPPED FROM EXCHANGE
ON THE BASIS OF SCENIC QUALITY

T. 24 N., R. 13 W.	
Sec. 31, Lots 1, 2, 3, 4, E1/2, E1/2W1/2	525.57 acres
Sec. 36, S1/2, SE1/4	80 acres
T. 23 N., R. 13 W.	
Sec. 1, All	640 acres
Sec. 6, Lots 1, 2, 3, 4, E1/2, E1/2W1/2	522.92 acres
Sec. 7, Lots 1, 2, 3, 4, 5, E1/2NW1/4, NE1/4SW1/4	160.41 acres
T. 23 N., R. 12 W.	
Sec. 6, Lots 8-23	679.36 acres

chapter 4

CONSULTATION AND COORDINATION

CHAPTER 4

CONSULTATION AND COORDINATION

HISTORY OF SCOPING EFFORTS

Beginning early in 1981, the BLM conducted meetings with other federal agencies, state and local agencies, the Navajo Indian Tribe, and the general public. The purpose of these meetings was to gather information regarding these groups' concerns about the various projects proposed to take place in the San Juan Basin. Two of these projects were special points of focus, the proposed New Mexico Generating Station and the Ute Mountain Exchange.

The following list enumerates the scoping meetings held for these projects.

Agency Meetings

Albuquerque	Federal Agencies-Monday, January 12, 1981, 10:00 a.m.-2:00 p.m., Albuquerque Convention Center.
Santa Fe	New Mexico State Agencies - Tuesday, January 13, 1981, 10:00 a.m.-2:00 p.m., Sweeney Convention Center.
Farmington	County and Local Governments - Thursday, January 15, 1981, 10:00 a.m.-2:00 p.m., Farmington Civic Center.

Indian Meetings

Crownpoint	Monday, January 19, 1981, 4:00-7:00 p.m., Community School House.
Lake Valley	Tuesday, January 20, 1981, 10:00 a.m., Community School House.
Huerfano	Wednesday, January 21, 1981, 10:00 a.m., Community School House.
Pueblo Pintado	Thursday, January 22, 1981, 10:00 a.m., Community School House.

Public Meetings

Albuquerque	Tuesday, February 3, 1981, 2:00-5:00 p.m., and 7:00-10:00 p.m., Albuquerque Convention Center.
Gallup	Wednesday, February 4, 1981, 2:00-5:00 p.m., and 7:00-10:00 p.m., Gallup Holiday Inn.
Farmington	Thursday, February 5, 1981, 2:00-5:00 p.m., and 7:00-10:00 p.m., Farmington Civic Center.

Taos	Monday, February 23, 1981, 7:00-10:00 p.m., Kachina Lodge.
Dulce	Wednesday, February 25, 1981, 1:00-4:00 p.m., Jicarilla Apache Tribal Council Meeting Room.

REVIEW OF THE DEA

Comments on the DEA are being requested from the governmental agencies, private groups, and individuals listed in Table 4-1.

PUBLIC INVOLVEMENT

Public meetings (open houses) will be held by the BLM in several locations throughout New Mexico during the month of July, 1981. Topics of discussion will include the Ute Mountain and PRLA DEAs, as well as the land use planning update for the Chaco Planning Unit. A news release giving the times and locations of these meetings will be published after completion of the Draft EA. These open houses will provide the public with an opportunity to voice their concerns with the Proposed Action as well as the adequacy of the DEA itself.

PUBLIC COMMENTS AND RESPONSES

This section, to be prepared for the Final Environmental Assessment, will contain the comments received on the Draft Environmental Assessment. Responses to the public comments will also be included.

LIST OF PREPARERS

Table 4-2 includes preparers of this DEA, including report writers and support personnel.

TABLE 4-1

DOCUMENT RECIPIENTS

Federal Government

Agencies

Department of Agriculture
- Soil Conservation Service

Department of the Interior
- Bureau of Indian Affairs
  - Albuquerque Area Office
  - Eastern Navajo Agency
  - Navajo Area Office
- Bureau of Reclamation
- National Park Service
  - Chaco Center
  - Indian Cultural Resources
  - Southwest Region
- Office of Surface Mining, Reclamation and Enforcement
- U.S. Fish and Wildlife Service
  - Office of Ecological Services
- U.S. Geological Survey

Officials

- Senator Pete Domenici
- Senator Harrison Schmitt
- Representative Manuel Lujan, Jr.
- Representative Joe Skeen

Tribal Government

Navajo Nation -- Chairman Peter McDonald

Presidents, Navajo Off-Reservation Chapters
- Huerfano
- Lake Valley
- Pueblo Pintado
- White Horse

Director, Navajo Tribal Land Administration

Local Government

San Juan Regional Committee

County Commission
- McKinley County
- San Juan County
- Taos County

McKinley County
- Planning Department
- Soil and Water Conservation District

San Juan County
- Planning Department
- Soil and Water Conservation District

Taos County

State Government

Bureau of Mines and Mineral Resources

Department of Finance and Administration
- Planning Division
  - Coordination/Clearinghouse Bureau
  - Historic Preservation Bureau

Energy and Minerals Department
- Mining and Minerals Division
  - Coal Surface Mining Bureau

Governor Bruce King

Highway Department

Land Office

Natural Resources Department
- Department of Game and Fish
- Soil and Water Conservation Division
- Water Resources Division
  - State Engineer

Private Groups

Special Interest Groups

National Council of Public Lands Users

New Mexico Archaeological Society

New Mexico Citizens for Clean Air and Water

New Mexico Wilderness Study Committee

New Mexico Wildlife Society

San Juan Wildlife Federation

Sierra Club

Wilderness Society

Universities

New Mexico State University

Companies

Ark Land
Eastern Associated Properties
Freeman United
Kin-Ark Corporation
Phillips Uranium
Plains Electric Generation and Transmission Corp.
Sunbelt Mining Company
Thermal Energy

Table 4-2

LIST OF PREPARERS

Report Writers

Name	Assignment	Education	Experience
John C. Arwood	Livestock	BS Range Management Animal Husbandry Agricultural Economics	BLM - 12 yrs. Range Conservationist
Angela W. Berger	Wilderness	MS Outdoor Recreation Planning	BLM - 3 1/2 yrs. Outdoor Recreation Planner
John E. Bristol	Visual Resources	BS Landscape Architecture	BLM - 4 yrs., USFS - 6 yrs. Landscape Architect
Jim Fogg	Hydrology	BS Environmental Biology MS Watershed	BLM - 3 yrs. USFS - 1 yr. Hydrologist
L. Kent Hamilton	Socioeconomics	BS Agricultural Economist	BLM - 4 yrs. BIA - 16 yrs. Economist and Land Use Planner
Sidney C. Houpt	T and E Plants Livestock	BS Range and Wildlife Management	BLM - 18 yrs. Range Conservationist
Elizabeth Hummer	Team Leader/Technical Coordinator	BS Wildlife Science	BLM - 3 1/2 yrs. Planning and Environmental Specialist

Table 4-2 (Cont'd)

Report Writers

Name	Assignment	Education	Experience
Joe J. Labay	Lands	BS Range Management	BLM - 7 yrs. Range Conservationist and Natural Resource Specialist - 7 yrs. Realty Specialist - 3 yrs. Area Manager
Randall P. Legler, Jr.	Wildlife	BS and MS Wildlife Management	BLM - 7 yrs. Wildlife Biologist, Corps of Engineers - 10 mos. Outdoor Recreation Wildlife Biologist, U.S. Fish and Wildlife Service - $2^{1/2}$ yrs. Wildlife Biologist.
George W. Nelson	Recreation	BS Range Management MS Recreation	BLM - 5 yrs. Natural Resource Specialist - 1 yr. Assistant Area Manager - 1 yr. District Recreation Planner
Rafe H. Padgett	Minerals	BS Geology	BLM - 2 yrs. Geologist
Coleman R. Robison	Paleontology	Ph.D. Paleobotany	BLM - 2 yrs. Paleobotanist
Sarah W. Spurrier	Writer/Editor	BA Psychology	BLM - $3^{1/2}$ yrs. Writer/Editor
Carol Thompson	Archaeologist	BA Anthropology	BLM - $1^{1/2}$ yrs. Archaeologist, BIA - 11 years Teacher, Anthropology.

LIST OF PREPARERS (Concluded)

Support Personnel

Name	Experience (BLM)	Name	Experience (BLM)
Harry DeLong	2 yrs. Cartographic Aid	Karen J. Noling	1 1/2 yrs. Clerk Typist
Myrna Finke	1 1/2 yrs. Cartographic Aid	Eleanor Pfeifer	2 yrs. Editorial Assistant
Penelope A. Mahon	1 yr. Clerk Typist	Shirley Torres	1 yr. Supervisory Editorial Assistant
Jeffery S. Nighbert	2 yrs. District Cartographer		

appendices

APPENDIX A-1

LEGAL DESCRIPTION FOR BISTI LANDS

Description		Acres
T. 18 N., R. 12 W.		
Section 2:	Lots 1, 2, 3, 4, $S^1/2NW^1/4$, $SW^1/4$	409.52
Section 11:	All	640.00
Section 14:	$N^1/2$	320.00
Section 23:	All	640.00
T. 22 N., R. 12 W.		
Section 4:	Lots 1, 2, 3, 4, $S^1/2N^1/2$, $S^1/2$	639.28
Section 6:	Lots 1, 2, 3, 4, 5, 6, 7, $S^1/2NE^1/4$, $SE^1/4NW^1/4$, $E^1/2SW^1/4$, $SE^1/4$	635.20
Section 8:	$N^1/2$	320.00
Section 10:	All	640.00
Section 18:	Lots 1, 2, 3, 4, $NE^1/4$, $E^1/2W^1/2$	476.08
T. 22 N., R. 13 W.		
Section 24:	$E^1/2NE^1/4$	80.00
T. 23 N., R. 11 W.		
Section 2:	Lots 1, 2, 3, 4, $S^1/2N^1/2$, $S^1/2$	639.36
Section 3:	Lots 1, 2, 3, 4, $S^1/2N^1/2$, $S^1/2$	638.58
T. 23 N., R. 12 W.		
Section 6:	Lots 8 through 23	679.36
Section 7:	Lots 5 through 19	630.79
Section 8:	Lots 1 through 14	594.74
Section 9:	Lots 1, 2, 3, and 4	170.32
Section 12:	Lots 1 through 16	674.32
Section 13:	Lots 1 through 16	666.65
Section 14:	Lots 1 through 8, $NW^1/4$	491.93
Section 17:	Lots 1 through 13	545.02
Section 18:	Lots 5 and 6	84.28
Section 19:	Lots 5 through 20	654.71
Section 20:	Lots 1 through 16	662.30
Section 21:	Lots 1 through 16	663.45
Section 22:	Lots 1 through 16	661.31
Section 23:	Lots 1, 2, 3, 4, 5, 6, 7, 8, $S^1/2$	649.63
Section 24:	Lots 1, 2, 3, 4, 5, 6, 7, 8, $S^1/2$	650.20
Section 26:	All	640.00
Section 28:	All	640.00
Section 29:	All	640.00
Section 30:	Lots 1, 2, 3, 4, $E^1/2$, $E^1/2W^1/2$	635.32
Section 31:	Lots 1, 2, 3, 4, $E^1/2$, $E^1/2W^1/2$	635.28
Section 34:	All	640.00

APPENDIX A-1 (concluded)

Description		Acres
T. 23 N., R. 13 W.		
Section 1:	All	640.00
Section 6:	Lots 1, 2, 3, 4, $E^1/2$, $E^1/2W^1/2$	522.92
Section 7:	Lots 1, 2, 3, 4, 5, $E^1/2NW^1/4$, $NE^1/4SW^1/4$	160.41
Section 9:	Lots 1, 2, $N^1/2SE^1/4$	166.80
Section 10:	Lots 1, 2, 3, 4, $N^1/2$, $N^1/2S^1/2$	653.36
Section 11:	Lots 1, 2, 3, 4, $N^1/2$, $N^1/2S^1/2$	650.28
Section 12:	Lots 1, 2, 3, 4, $N^1/2$, $N^1/2S^1/2$	643.52
Section 13:	$NW^1/4$, $S^1/2$	480.00
Section 14:	All	640.00
Section 15:	$NW^1/4$	160.00
Section 20:	$SE^1/4SE^1/4$	40.00
Section 22:	$S^1/2SW^1/4$	80.00
Section 23:	All	640.00
Section 24:	All	640.00
Section 26:	All	640.00
Section 28:	All	640.00
T. 24 N., R. 11 W.		
Section 21:	$S^1/2$	320.00
Section 22:	$S^1/2$	320.00
Section 27:	All	640.00
Section 28:	All	640.00
Section 33:	$N^1/2$	320.00
Section 34:	$N^1/2$	320.00
Section 34:	$S^1/2$	320.00
Section 35:	All	640.00
T. 24 N., R. 12 W.		
Section 31:	Lot 17	42.15
T. 24 N., R. 13 W.		
Section 31:	Lots 1, 2, 3, 4, $E^1/2$, $E^1/2W^1/2$	525.57
Section 36:	$S^1/2SE^1/4$	80.00

APPENDIX A-2

LEGAL DESCRIPTION FOR UTE MOUNTAIN LANDS

A certain tract of land near Costilla, Taos County, New Mexico, described as part of the westerly portion of the Sangre de Cristo Land Grant and part of Sections 7, 8 and part of Section 6, Township 1 South, Range 73 West, part of Sections 1 and 2, all of Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 15, 16, 17, 18, 19, 20, 21, 22, 27, 28, 34 and part of Sections 14, 23, 26, 29, 35, 30, 32 and 33, Township 1 South, Range 74 West, part of Sections 3 and 4, Township 2 South, Range 74 West, of a private survey for the Costilla Estate Development Company by T. C. McPherson, as shown on a Map of Sectionizing filed in the Taos County Courthouse on May 11, 1920; and further described by metes and bounds as follows:

TRACT "A" BEGINNING at the southwest corner of the Sangre de Cristo Land Grant, a 1943 U.S.G.L.O. brass cap monument found, thence;

West, 348.0 feet to Point 1 on the centerline of the Rio Grande, thence upstream along the centerline of said rio the following meander courses;
N. 01° 48' E., 901.0 feet to Point 2, thence;
N. 38° 00' E., 480.5 feet to Point 3, thence;
N. 19° 43' W., 926.6 feet to Point 4, thence;
N. 38° 29' E., 1824.2 feet to Point 5, thence;
N. 64° 26' E., 2034.9 feet to Point 6, thence;
N. 35° 45' E., 274.4 feet to Point 7, thence;
N. 04° 57' E., 627.9 feet to Point 8, thence;
N. 42° 06' E., 1020.2 feet to Point 9, thence;
N. 12° 17' E., 983.0 feet to Point 10, thence;
N. 11° 51' E., 1195.3 feet to Point 11, thence;
N. 45° 01' E., 420.4 feet to Point 12, thence;
N. 71° 54' E., 127.7 feet to Point 13, thence;
N. 23° 22' E., 498.3 feet to Point 14, thence;
N. 29° 19' W., 613.7 feet to Point 15, thence;
N. 00° 08' E., 657.0 feet to Point 16, thence;
N. 38° 52' W., 506.3 feet to Point 17, thence;
N. 44° 02' W., 354.6 feet to Point 18, thence;
N. 17° 56' E., 242.3 feet to Point 19, thence;
N. 36° 55' E., 372.2 feet to Point 20, thence;
N. 25° 23' W., 1085.5 feet to Point 21, thence;
N. 10° 54' E., 1063.2 feet to Point 22, thence;
N. 25° 30' E., 687.4 feet to Point 23, thence;
N. 28° 51' E., 302.2 feet to Point 24, thence;
N. 52° 15' E., 236.6 feet to Point 25, thence;
N. 10° 24' W., 1157.3 feet to Point 26, thence;
N. 22° 55' W., 1151.6 feet to Point 27, thence;
N. 00° 35' W., 768.2 feet to Point 28, thence;
N. 13° 31' E., 254.7 feet to Point 29, thence;
N. 00° 04' W., 855.2 feet to Point 30, thence;
N. 35° 57' E., 454.5 feet to Point 31, thence;
N. 25° 34' E., 215.4 feet to Point 32, thence;
N. 21° 51' W., 574.8 feet to Point 33, on the New Mexico Colorado State Line, thence leaving the centerline of the Rio Grande and along the state boundary line;
N. 89° 55' E., 250.0 feet to the 147 + 70.58 mile marker, a 1925 U.S. Government brass cap monument set in concrete found, thence;
N. 89° 55' E., 4655.2 feet to the 147 mile marker a 1925 U.S. Government brass cap monument set in concrete found, thence;
N. 89° 58' E., 5364.9 feet to a scribed stone found for the 146 mile marker, thence;
N. 89° 52' E., 5279.6 feet to a 2 inch iron pipe found for the 145 mile marker, thence;
N. 89° 55' E., 5280.0 feet to the 144 mile marker, a 1928 U.S. Government brass cap set in concrete found, thence;
N. 89° 42' E., 5191.5 feet to the 143 mile marker, a 1928 U.S. Government brass cap set in concrete found, thence;
S. 88° 24' E., 431.0 feet to the 142 + 75 mile marker, a 1928 U.S. Government brass cap monument set in concrete found, thence leaving the New Mexico Colorado State Line;
S. 00° 09' W., 2644.4 feet to a scribed stone 1/4 corner found, thence;
S. 00° 12' E., 7917.8 feet to a 1/2 inch rebar set, thence;
S. 00° 01' E., 4285.5 feet to a point, thence;
S. 89° 47' W., 970.3 feet to a point, thence;
S. 00° 01' E., 984.6 feet to a point, thence;
S. 89° 47' W., 2979.6 feet to a 1/2 inch rebar set, thence;
S. 00° 01' E., 5295.2 feet to a 1/2 inch rebar set, thence;
S. 00° 01' E., 5274.2 feet to a 1/2 inch rebar set, thence;
S. 00° 01' E., 5274.2 feet to a 1/2 inch rebar set, thence;
N. 89° 56' W., 5513.7 feet to a 1/2 inch rebar set, thence;
S. 00° 04' W., 3651.6 feet to the S.E. corner of this tract a 1/2 inch rebar set on the southerly boundary of the Sangre de Cristo Land Grant from whence the S 1/2 Mile Marker, a 1943 U.S.G.L.O. brass cap monument found bears S. 55° 43' E., 993.1 feet distant, thence along said grant boundary;
N. 55° 43' W., 1646.3 feet to the S Mile Marker, a 1943 U.S. G.L.O. brass cap monument found, thence;
N. 55° 31' W., 132.1 feet to the closing corner between Sections 27 and 28, T. 31 N., R. 12 E., N.M.P.M., a 1943 U.S.G.L.O. brass cap monument found, thence;
N. 55° 45' W., 270.5 feet to the closing corner between Sections 21 and 28, T. 31 N., R. 12 E., N.M.P.M., a 1943 U.S.G.L.O. brass cap monument found, thence;
N. 55° 32' W., 2218.5 feet to the 4 1/2 Mile Marker, a 1943 U.S.G.L.O. brass cap monument found, thence;
N. 55° 36' W., 2619.3 feet to the 4 Mile Marker, a 1943 U.S.G.L.O. brass cap monument found, thence;
N. 55° 47' W., 1330.2 feet to the closing corner between Sections 20 and 21, T. 31 N., R. 12 E., N.M.P.M., a 1943 U.S.G.L.O. brass cap monument found, thence;
N. 55° 46' W., 1328.2 feet to the 3 1/2 Mile Marker, a 1943 U.S.G.L.O. brass cap monument found, thence;
N. 55° 46' W., 2005.3 feet to the closing corner between Sections 17 and 20, T. 25 N., R. 12 E., N.M.P.M., a 1943 U.S.G.L.O. brass cap monument found, thence;
N. 55° 36' W., 654.0 feet to the 3 Mile Marker, a 1943 U.S.G.L.O. brass cap monument found, thence;
N. 54° 19' W., 2332.5 feet to the closing corner between Sections 17 and 18, T. 31 N., R. 12 E., N.M.P.M., a 1943 U.S.G.L.O. brass cap monument found, thence;
N. 54° 40' W., 338.4 feet to the 2 1/2 Mile Marker, a 1943 U.S.G.L.O. brass cap monument found, thence;
N. 55° 51' W., 2670.4 feet to the 2 Mile Marker, a 1943 U.S.G.L.O. brass cap monument found, thence;
N. 55° 28' W., 2636.6 feet to the 1 1/2 Mile Marker, a 1943 U.S.G.L.O. brass cap monument found, thence;
N. 55° 29' W., 724.7 feet to the closing corner between Sections 18, T. 31 N., R. 12 E., N.M.P.M. and Section 13, T. 31 N., R. 11 E., N.M.P.M., a 1943 U.S.G.L.O. brass cap monument found, thence;
N. 56° 09' W., 34.2 feet to the closing corner between Sections 13 and 12, T. 31 N., R. 11 E., N.M.P.M., a 1943 U.S.G.L.O. brass cap monument found, thence;
N. 55° 23' W., 1882.2 feet to the 1 Mile Marker, a 1943 U.S.G.L.O. brass cap monument found, thence;
N. 55° 16' W., 2645.9 feet to the 1/2 Mile Marker, a 1943 U.S.G.L.O. brass cap monument found, thence;
N. 55° 17' W., 1858.3 feet to the closing corner between Sections 11 and 12, T. 31 N., R. 11 E., a 1943 U.S.G.L.O. brass cap monument found, thence;
N. 55° 17' W., 792.7 feet to the point and place of beginning.

This tract contains 17,134.555 acres, more or less.

Source: BIA, 1979.

APPENDIX A-3

RESOURCE COMPONENTS ON THE BISTI LANDS

Location	Paleontology	Coal	Minerals: CLE[a]	Minerals: Oil and Gas	Minerals: Locatable Mining Claims[b]	Water: Flood-Plains[c]	Livestock: Allotment Name	Livestock: Allotment No.	Livestock: Permittee	Recreation: Developments[d]	Rights-of-Ways	Lands: Navajo Families	Lands: Location within Section	Lands: Acres	Visual Resources
T. 24 N., R. 13 W., Section 31	ACEC	Western NM-19986[e] Nm-0186612[f]		1	36	86	Bisti Comm.	6008	Indian		20' Trans. ROW-NM-12221				ACEC
Section 36					5	46	Bisti Comm.	6008	Indian						ACEC
T. 24 N., R. 12 W., Section 31		Eastern NM-38388[g]					Bisti Comm.	6008	Indian		20' Trans. ROW-NM-23125				
T. 24 N., R. 11 W., Section 21							Black Lake	6010	Paragon						
Section 22				4			Otis Comm.	6011	Indian						
Section 27				1		71	Otis Comm.	6011	Indian	1-R					
Section 28				1			Black Lake	6010	Paragon						
Section 33				2			Black Lake	6010	Paragon						
Section 34				1			Black Lake	6010	Paragon	1-R, 1-C					
Section 35							Black Lake	6010	Paragon						
T. 23 N., R. 13 W., Section 1	ACEC	Western NM-0186615[f]	CLE		44	88	Bisti Comm.	6008	Indian						ACEC
Section 3[h]												Modern House, Shed, Corral	SE1/4	160	
Section 6	ACEC	Western NM-0186612[f] NM-19986[e]		1	36	28	Bisti Comm.	6008	Indian						ACEC
Section 7		Western NM-0186612[f] NM-19986[e]		1	10		Bisti Comm.	6008	Indian						
Section 9		Western NM-0186612[f]			20		Bisti Comm.	6008	Indian		20' Trans. ROW-NM-12221				
Section 10	ACEC	Western NM-0186615[f] NM-19986[e]			40		Bisti Comm.	6008	Indian	1-W		Windmill; Trailer; Corral; Shed; Tent Structure	NW1/4 SW1/4	326.64	
Section 11	ACEC	Western NM-0186615[f] NM-19986[e]			40		Bisti Comm.	6008	Indian			2 Rock Houses; 2 Rock Sheds; Wooden Shed; Large Corral	NW1/4	160	
Section 12	ACEC	Western NM-0186615[f]			39	102	Bisti Comm.	6008	Indian			Modern House; 2 Corrals; Livestock Shed Hogan; Old Corral	NW1/4 SW1/4	160 162.65	

APPENDIX A-3 (Continued)

Location	Paleontology	Coal	Minerals CLE[a]	Oil and Gas	Locatable Mining Claims[b]	Water Flood-Plains[c]	Livestock Allotment Name	Allotment No.	Permittee	Recreation Developments[d]	Rights-of-Ways	Lands Navajo Families	Location within Section	Acres	Visual Resources
T. 23 N., R. 13 W., (Cont'd)															
Section 13				2	4	83	Bisti Comm. Tsaya	6008 6012	Indian Paragon			Hogan; Abandoned Hogan; Home; Corral	SE1/4	160	
Section 14				2	10	155	Bisti Comm. Tsaya	6008 6012	Indian Paragon		20' Trans. ROW-NM-12221				
Section 15				1	4		Bisti Comm.	6008	Indian						
Section 20				1	1		Bisti Comm.	6008	Indian						
Section 22															
Section 23				2			Bisti Comm. Tsaya	6008 6012	Indian Paragon	2-R, 1-P	200' R.R. ROW-NM-29324 20' Trans. ROW-NM-12221				
Section 24					8		Tsaya	6012	Paragon	1-R, 1-P	200' R.R. ROW-NM-29324 20' Trans. ROW-NM-12221 350' x 350' Meter Sta. ROW-NM-31134				
Section 26				1			Tsaya	6012	Paragon	1-CG, 1SE					
Section 28				1			Lake Valley Comm.	6016	Indian			Old House; Hogan; 3 Shade Houses; Corral	SW1/4	160	
T. 23 N., R. 12 W.,															
Section 6	ACEC	Eastern NM-68026[e]	CLE	1[f]	31	20	Eli Smith	6009	Indian	1-R					ACEC
Section 7			CLE	1	38	71	Eli Smith	6009	Indian		5'x5' Well Site ROW-NM-30797				
Section 8			CLE	1	39	129	Eli Smith	6009	Indian		5'x5' Well Site ROW-NM-30797				
Section 9			CLE	1	11	28	Tsaya	6012	Paragon						
Section 12		Eastern NM-38356[e]		1	6	53	Black Lake	6010	Paragon						
Section 13	ACEC	Ark Land NM-37532[e]		1	40		Black Lake	6010	Paragon	ACEC					
Section 14	ACEC	Ark Land NM-37536[e]		2	40	26	Black Lake	6010	Paragon	ACEC					

APPENDIX A-3 (Continued)

Location	Paleontology	Coal	Minerals		Water		Livestock			Recreation		Lands		Visual Resources
			CLE[a]	Oil and Gas	Locatable Mining Claims[b]	Flood-Plains[c]	Allotment Name	Allotment No.	Permittee	Developments[d]	Rights-of-Ways	Navajo Families	Location within Section	Acres
T. 23 N., R. 12 W., (Cont'd) Section 17			CLE	1	41	10.8	Tsaya, Eli Smith	6012 6009	Paragon Indian	2-CG				
Section 18		Ark Land NM-37528[e]	CLE	1	6	19	Eli Smith	6009	Indian					
Section 19		Ark Land NM-37528[e]		1	36	8	Tsaya	6012	Paragon	1-P	TLMS[k] 200' R.R. ROW-NM-29324			
Section 20		Ark Land NM-37528[e]	CLE	2	35	75	Tsaya	6012	Paragon					
Section 21		Ark Land NM-37528[e]	CLE	2	44	5.3	Tsaya	6012	Paragon	1-P				
Section 22	ACEC	Ark Land NM-37528[e]			35	33	Tsaya	6012	Paragon	1-P(1.3M)	ACEC			
Section 23	ACEC	Ark Land NM-37528[e]		2	40		Tsaya	6012	Paragon	1-W	ACEC			
Section 24	ACEC	Eastern NM-38356[e]		1	4		Black Lake	6010	Paragon		ACEC			
Section 26	ACEC	Ark Land NM-37548[e]		1	30		Tsaya	6012	Paragon	2-R(1-BM)	ACEC			
Section 28		Ark Land NM-37548[e]		1[f] 1	40		Tsaya	6012	Paragon	1-P(M)(1-P)				
Section 29		Ark Land NM-37548[e]		1	51		Tsaya	6012	Paragon		200' R.R. ROW-NM-29324			
Section 30		Ark Land NM-37548[e]		1	40		Tsaya	6012	Paragon		200' R.R. ROW-NM-29324 20' Trans. ROW-NM-12221			
Section 31				1	4		Tsaya	6012	Paragon	1-P(M) 1-CG	20' Trans. ROW-NM-12221 350' x 350' Meter Sta. ROW-NM-31135			
Section 34	ACEC			2	4		Tsaya	6012	Paragon	1-P(2M)	ACEC			

APPENDIX A-3 (Concluded)

Location	Paleontology: Coal	Minerals: CLE[a]	Minerals: Oil and Gas	Minerals: Locatable Mining Claims[b]	Water: Flood-Plains[c]	Livestock: Allotment Name	Livestock: Allotment No.	Livestock: Permittee	Recreation: Developments[d]	Lands: Rights-of-Ways	Lands: Navajo Families	Lands: Location within Section	Lands: Acres	Visual Resources
T. 23 N., R. 11 W., Section 2						Black Lake	6010	Paragon						
Section 3			1			Black Lake	6010	Paragon	1-W, 3-R					
T. 22 N., R. 13 W., Section 24			2		38	Tsaya	6012	Paragon	1-R					
T. 22 N., R. 12 W., Section 4			3			Tsaya	6012	Paragon	1-F(M)					
Section 6			1			Tsaya	6012	Paragon		20' Trans. ROW-NM-12221 50' Road ROW-NM-29482				
Section 8			1			Tsaya	6012	Paragon	1-P	200' R.R. ROW-NM-29324				
Section 10			2		99	Tsaya	6012	Paragon	1-R (BW)	200' R.R. ROW-NM-29324 20' Trans. ROW-NM-0556114				
Section 18			1		77	Tsaya	6012	Paragon	1-R	20' Trans. ROW-NM-12221				
T. 18 N., R. 12 W., Section 2				25	41	Jacobs	6036	Phillips	1-F(M)					
Section 11				50	38	Jacobs	6036	Phillips	1-F(2M)1-W					
Section 14			1	19	2.8	Jacobs	6036	Phillips	1-F(5M)	50' Trans. ROW-NM-40364				
Section 23				46	58	Jacobs	6036	Phillips	1-F(M)	150' Road ROW-NM-3870				

Notes:
[a] Coal lease exchange lands
[b] Number of mining claims per section. All the claims except for those listed in T. 18 N., R. 12 W., were filed by Public Service Land Company and Paragon Resources. Claims in T. 18 N., R. 12 W. are filed by Phillips Uranium.
[c] Number of acres of floodplains per section
[d] R - Reservoir
C - Corral
W - Well
BW - Base water
F - Fence (M) - mile
SE - Study enclosure
CG - Cattle guard
[e] Competitive Coal Lease Appplications
[f] Outstanding Coal Lease
[g] Preference Right Lease Applications
[h] Navajo family living on lands adjacent to the Bisti Lands
[i] Application for oil and gas lease
[j] Sublease of NM 23240 lease
[k] Tanner Lake Way Station

APPENDIX B

DEFINITIONS FOR IMPORTANCE VALUES ASSIGNED
TO FOSSIL OCCURRENCES

Class I CRITICAL/MITIGATION OR PROTECTION ESSENTIAL

This class includes any locality containing fossils that, by their rarity or exceptionally good or complete preservation, will add considerably to knowledge of the paleobiology, morphology, stratigraphic or geographic distribution, or paleoenvironment of the fossil organisms. Such localities often contain a great abundance of ordinarily rare taxa, fossils new to science, parts of fossil organisms that have not been known previously and/or unusual or unique in situ assemblages of fossils. Mitigation of these sites is essential because of the great amount of new paleontological information they contain. Depending on the size and type of deposit, mitigation may include total protection, or salvage through large scale surface collecting, excavation or bulk sediment sampling for screening purposes; or salvage may be limited to a statistically valid sample of all forms present.

Class II HIGHLY IMPORTANT/MITIGATION STRONGLY RECOMMENDED

These are localities containing fossil materials that significantly extend our knowledge of the morphology, paleobiology, stratigraphic or geographic distribution, or paleoecology of a species or assemblage. Highly Important sites generally contain numerous surface deposits that suggest more extensive or important remains would be revealed by intensive collecting and excavation. In some cases, beautifully preserved single specimens, such as a complete dinosaur bone or turtle carapace would also be considered Highly Important. High surface concentrations of small fossils, such as fish scales, reptile teeth, or freshwater molluscs, which suggest that bulk screening would produce hundreds or thousands of additional specimens are likewise Highly Important. Mitigation is strongly recommended for these sites and would consist of salvage similar to that recommended for the Critical localities. In most cases valid statistical samples would probably suffice but for rare species as much material as possible should be collected.

Class III IMPORTANT/MITIGATION RECOMMENDED

Important localities contain fossil materials that are relatively plentiful, common near the locality and elsewhere, and provide useful information for stratigraphic, geographic or variability studies. Single well preserved skeletal parts that are known from other specimens but worthy of examination or display are also in this category. Mitigation would generally be limited to a statistically valid sample of the fossils at the locality; large scale excavation or screening would rarely be needed.

Class IV INSIGNIFICANT/MITIGATION OPTIONAL

These localities contain fossils that are very poorly preserved, fragmented or undiagnostic and that are common elsewhere. Such localities provide minimal new information and show no indication that additional collecting, excavation or screening would provide additional material of value. Mitigation is optional and would be limited to sites that are near more important deposits.

Source: Kues, et al. 1977.

APPENDIX C

LEGAL DESCRIPTION AND SERIAL NUMBER OF OIL AND GAS LEASES ON BISTI LANDS

Legal Description	Serial No.
T. 18 N., R. 12 W., Sec. 14	NM 14427
T. 22 N., R. 12 W., Sec. 4	NM 19569 NM 25848 NM 34192
Sec. 6	NM 25848
Sec. 8	NM 25849
Sec. 10	NM 16764 NM 19569
Sec. 18	NM 35318
T. 22 N., R. 13 W., Sec. 24	NM 18466 NM 35119
T. 23 N., R. 11 W., Sec. 3	NM 34601
T. 23 N., R. 12 W., Sec. 6	NM 43068[a]
Sec. 7	NM 35320
Sec. 8	NM 35320
Sec. 9	NM 15846
Sec. 12	NM 35568
Sec. 13	NM 35568
Sec. 14	NM 35568 NM 27436
Sec. 17	NM 18465
T. 23 N., R. 12 W., (Cont'd)	
Sec. 18	NM 36357
Sec. 19	NM 32544
Sec. 20	NM 23240 NM 36357
Sec. 21	NM 18465 NM 25042
Sec. 23	NM 25327 NM 25041
Sec. 24	NM 25041
Sec. 26	NM 24979
Sec. 28	NM 23240[b] NM 33389
Sec. 29	NM 38288
Sec. 30	NM 17017
Sec. 31	NM 18951
Sec. 34	NM 25043 NM 24980
T. 23 N., R. 13 W., Sec. 6	NM 26832
Sec. 7	NM 27608
T. 23 N., R. 13 W., (Cont'd)	
Sec. 13	NM 29348 NM 32366
Sec. 14	NM 30354 NM 40211
Sec. 15	NM 38290
Sec. 20	NM 15659
Sec. 23	NM 32366
Sec. 24	NM 19572
Sec. 26	NM 26355
Sec. 28	NM 26833
T. 24 N., R. 11 W., Sec. 22	NM 25846 NM 32125 NM 17192 NM 14100
Sec. 27	NM 19160
Sec. 28	NM 19160
Sec. 33	NM 25847 NM 29344
Sec. 34	NM 35118
T. 24 N., R. 13 W., Sec. 31	NM 26663

Notes: [a] Application for oil and gas lease.
[b] Sublease of NM 23240 lease.

APPENDIX D-1

STREAMFLOW NEAR BISTI LANDS IN SAN JUAN BASIN
09367930 - Hunter Wash at Bisti Trading Post, New Mexico

	Water Year 1975		Water Year 1976		Water Year 1977		Water Year 1978		Water Year 1979	
	qp[a]	Qm[b]	qp	Qm	qp	Qm	qp	Qm	qp	Qm
Oct.	—	—	0	0	0	0	0.18	0.4	9.0	52
Nov.	—	—	0	0	0	0	12	24	27	323
Dec.	—	—	0	0	0	0	0	0	17	72
Jan.	—	—	0.16	0.7	1.7	17	1.7	9.8	30	183
Feb.	—	—	0.47	0.9	1.1	8.5	1.5	8.1	16	124
Mar.	—	—	0	0	0.18	1.1	9.4	29	16	46
Apr.	6.2	20	0	0	0.42	3.0	5.3	12	0.31	0.6
May	10	44	3.0	10	1.1	2.7	48	166	0.79	2.6
June	0	0	1.5	7.3	0	0	0	0	0	0
July	96	305	2.7	14	29	123	0	0	3.1	6.9
Aug.	0.19	0.4	110	355	74	256	1.7	14	22	126
Sept.	40	170	45	121	12	28	168	346	0	0
Annual	96	539	110	509	74	439	168	609	30	936

Source: USGS, WATSTORE 1980.

Notes: [a] Peak daily flow - qp in cubic feet per second (cfs).
[b] Monthly total - Qm in acre-feet.

APPENDIX D-2

STREAMFLOW NEAR BISTI LANDS IN SAN JUAN BASIN
09367710 - De-na-zin Wash Near Bisti Trading Post, New Mexico

	Water Year 1976		Water Year 1977		Water Year 1978		Water Year 1979	
	qp[a/]	Qm[b/]	qp	Qm	qp	Qm	qp	Qm
Oct.	—	--	0	0	0	0	57	359
Nov.	—	--	0	0	38	139	139	796
Dec.	—	--	0	0	0	0	2.2	22
Jan.	0	0	1.4	11	0	0	316	1,590
Feb.	17	106	2.5	31	4.1	52	209	1,590
Mar.	0	0	1.7	5.4	54	162	442	1,470
Apr.	0	0	0	0	3.6	15	6.7	20
May	46	110	16	37	657	2,530	7.0	21
June	0	0	0	0	0	0	0	0
July	21	157	140	564	0.2	0.4	92	474
Aug.	98	550	79	450	16	49	449	2,650
Sept.	24	100	23	46	353	736	0	0
Annual	98	1,023	140	1,140	657	3,680	449	8,990

Source: USGS, WATSTORE 1980.

Notes: a/ Peak daily flow - qp in cubic feet per second (cfs).
b/ Monthly total - Qm in acre-feet.

APPENDIX D-3

BISTI AREA PEAK DISCHARGE ESTIMATES

Station or Site Name	Drainage Area (mi^2)	2-yr peak flow (cfs[a])	5-yr peak flow (cfs)	10-yr peak flow (cfs)	25-yr peak flow (cfs)	50-yr peak flow (cfs)	Remarks
Coal Creek above Tanner Lake	100	1,360	2,850	4,230	6,250	7,820	At high discharges there are overflows into Tanner Lake.
De-na-zin above Tanner Lake	19.6	1,380	2,890	4,330	6,330	7,920	At gaged site.
Badlands outflow	0.027	14	41	73	133	197	Near simulated rain test plots
Badlands outflow	.03	25	73	125	223	322	Near simulated rain test plots
De-na-zin at Tanner Lake ford	138	9,700	17,500	24,200	32,500	37,900	Represents most of the flow at De-na-zin near Bisti Gage except Alamo Wash.
Trib. to De-na-zin N. of Tanner Lake	1.23	49	132	222	385	543	Some spill into drainage from NW at high discharges.

Source: USDI, BLM 1976.

Note: [a] cfs = cubic feet per second

APPENDIX E

PRINCIPAL ARCHEOLOGICAL INVENTORIES ON THE BISTI LANDS

Contract Holder	Supervising Archeologist and Date of Report	Contracting Organization	Area of Inventory	Number of Acres Inventoried for Cultural Resources
Cultural Resource Management Program, New Mexico State University, San Juan Campus, Farmington, New Mexico.	Billy J. Naylor 1976	Ark Land Company	T. 23 N., R. 12 W., Secs. 21[a], 22, 23[a], 26[a], 27, 28.	2,600
Division of Conservation Archaeology, San Juan County Archaeological Research Center and Library, Farmington, New Mexico.	Margaret A. Powers 1979	Public Service Company of New Mexico	T. 23 N., R. 13 W., Secs. 13[a], 14, 23, 24.	2,432
Archaeological Associates Inc., Boulder, Colorado.	Hannah Huse, B.A. Noisat, and J.A. Halasi 1978	Bureau of Land Management, Albuquerque District	T. 22 N., R. 12 W., Sec. 4; T. 23 N., R. 12 W., Sec. 31; T. 23 N., R. 13 W., Sec. 26; T. 24 N., R. 11 W., Sec. 33[b].	2,240
Division of Conservation Archaeology, San Juan County Archaeological Research Center and Library, Farmington, New Mexico.	Mark Ganas 1980	Western Coal Company	T. 23 N., R. 13 W., Secs. 1[a], 9[a], 10[a], 11[a], 12.	2,160
			TOTAL	9,432

Source: BLM Albuquerque District Archeological Site Files.

Notes: [a] Only a portion of this section was included in the inventory.
[b] The entire section was inventoried, but only the N1/2 is within the selected lands.

APPENDIX F-1

INVENTORY/EVALUATION RATING CRITERIA AND SCORE

Scenic Quality

Scenic Quality is perhaps best described as the overall impression retained after driving through, walking through, or flying over an area of land. In the VRM process, rating Scenic Quality requires a brief description of the existing scenic values in a landscape. This step identifies (1) areas that must be protected, (2) opportunities for enhancement and rehabilitation, and (3) opportunities for improvement by reducing the contrast of cultural modifications.

When inventoried, an area is first divided into subunits that appear homogeneous, generally in terms of landform and vegetation. Each area is then rated by seven Key Factors: landform, vegetation, water, color, influence of adjacent scenery, scarcity, and cultural modification. A standardized point system assigns great, some, or little importance to each factor. The values for each category are calculated and, according to total points, three Scenic Quality Classes are determined and mapped:
Class A Areas that combine the most outstanding characteristics of each rating factor (19-33 points).
Class B Areas in which there is a combination of some outstanding features and some that are fairly common to the physiographic region (12-18 points).
Class C Areas in which the features are fairly common to the physiographic region (0-11 points).

Landform	Vegetation	Water	Color	Adjacent Scenery	Scarcity	Cultural Modifications
High vertical relief such as prominent cliffs, spires or massive rock outcrops; or severe surface variation or highly eroded formations including major badlands or dune systems; or detail features dominant and exceptionally striking and intriguing such as glaciers. 5	A variety of vegetative types in interesting forms, textures, and patterns. 5	Clear and clean appearing, still, or cascading white water, any of which are a dominant factor in the landscape. 5	Rich color combinations, variety or vivid color; or pleasing contrasts in the soil, rock, vegetation, water or snow fields. 5	Adjacent scenery greatly enhances visual quality. 5	One of a kind; or unusually memorable or very rare within region. Consistent chance for exceptional wildlife or wildflower viewing. 6	Free from esthetically undesirable or discordant sights and influences; or modifications add favorably to visual variety. 2
Steep canyons, mesas, buttes, cinder cones and drumlins or interesting erosional patterns or variety in size and shape of landforms; or detail features present and interesting, though not dominant or exceptional. 3	Some variety of vegetation, but only one or two types. 3	Flowing or still, but not dominant in the landscape. 3	Some intensity or variety in colors and contrast of the soil, rock and vegetation, but not a dominant scenic element. 3	Adjacent scenery moderately enhances overall visual quality. 3	Distinctive, though somewhat similar to others within the region. 2	Scenic quality is somewhat depreciated by inharmonious intrusions, but not so extensively that they are entirely negated; or modifications add little or no visual variety to the area. 0
Low, rolling hills, foothills or flat valley bottoms; interesting detailed landscape features few or lacking. 1	Little or no variety or contrast in vegetation. 1	Absent, or not noticeable. 0	Subtle color variations, contrast or interest; generally muted tones. 1	Adjacent scenery has little or no influence on overall visual quality. 0	Interesting within its setting, but fairly common within the region. 1	Modifications are so extensive that scenic qualities are mostly nullified or substantially reduced. -4

SCENIC QUALITY A= 19-33
B= 12-18
C= 0-11

Source: Visual Resource Management Program BLM, Washington D.C. 1980.

APPENDIX F-2

SCENIC QUALITY RATING CRITERIA

landform

Topography becomes more interesting as it gets steeper or more massive, or more severely or universally sculptured. Outstanding landforms may be monumental, as the Grand Canyon, the Sawtooth Mountain Range in Idaho, the Wrangell Mountain Range in Alaska, or they may be exceedingly artistic and subtle as certain badlands, pinnacles, arches and other extraordinary formations.

vegetation

Give primary consideration to the variety of patterns, forms, and textures created by plant life. Consider short-lived displays when they are known to be recurring or spectacular. Consider also smaller scale vegetational features which add striking and intriguing detail elements to the landscape; e.g., gnarled or windbeaten trees, joshua trees, etc.

water

That ingredient which adds movement or serenity to a scene. The degree to which water dominates the scene is the primary consideration in selecting the rating score.

color

Consider the overall color(s) of the basic components of the landscape (i.e., soil, rock, vegetation, etc.) as they appear during seasons or periods of high use. Key factors to use when in rating "color" are variety, contrast and harmony.

adjacent scenery

Degree to which scenery outside the scenery unit being rated enhances the overall impression of the scenery within the rating unit. The distance which adjacent scenery will influence scenery within the rating unit will normally range from 0-5 miles, depending upon verticality of topography, vegetative cover and other such factors. This factor is generally applied to units which would normally rate very low in score, but the influence of the adjacent unit would enhance the visual quality and raise the score.

scarcity

This factor provides an opportunity to give added importance to one or all of the scenic features that appear to be relatively unique or rare within one physiographic region. There may also be cases where a separate evaluation of each of the key factors does not give a true picture of the overall scenic quality of an area. Often it is a number of not so spectacular elements in the proper combination that produces the most pleasing and memorable scenery - the scarcity factor can be used to recognize this type of area and give it the added emphasis it needs.

cultural modifications

Consider the impact of change on the visual quality of the characteristic landscape. Cultural modifications in the landform/water, vegetation and addition of structures should be considered and may detract from the scenery in the form of a negative intrusion or actually complement or improve the scenery quality of a unit. Be careful not to confuse interest with scenery quality. Rate accordingly.

Source: BLM Manual Section 8411, 1978.

APPENDIX F-3

UTE MOUNTAIN SCENIC QUALITY

A sagebrush-grassland plain comprises the majority of the exchange lands. This is a piedmont alluvial plain forming at the base of the Sangre de Cristo Mountains. The land has a gentle roll in a generally level landform. Arroyos and ephemeral creeks cross the plains. With the exception of Costilla Creek, they form only a minor depression in the landform. Costilla Creek has eroded through the plateau to join the Rio Grande some 120 feet below. The plain is dominated by big sage and broom snakeweed with small percentages of grasses and shrubs. Textures and colors are even with little contrast. Soils are light, shrubs are chalky greens, grasses range from light green to light ochre. Patches of false buckwheat add a localized but strong red to the landscape. Strong value (light to dark), chroma (color), and lineal contrasts are provided by the irrigated farmlands adjoining the exchange lands.

The Rio Grande Gorge is a 120-foot cut snaking its way along the western edge of the exchange lands. Vegetative species are similar to the plains but are interspersed among the basaltic boulders lining the gorge. Some willows and saltcedars grow along the floor of the gorge but regular scouring by the Rio Grande prevents much accumulation. The Rio Grande dominates the gorge. It reflects the steepness of the sides and the intensity of the sky back to the viewer. The dark basaltic rocks contrast sharply with the grey-greens, ochres, yellows, reds, and tans of the vegetation. Seasonal changes add much variety. Once in the gorge, viewing ranges are confined to the gorge. From the plains, particularly from the air or Ute Mountain, the gorge adds a striking lineal element to the landscape. The gorge begins about six miles north of the Colorado state line and gradually deepens to about 1,200 feet deep at Embudo about three miles south of the southern Taos County line. The gorge is natural in character with the only distinct intrusion, an old building and some corrals, north of the state line.

Ute Mountain is one of several extinct volcanoes dotting the plateau between the Sangre de Cristos on the east and the San Juan, Conejos, and Jemez mountains on the west. This conical peak rises to 10,093 feet, some 2,500 feet above the surrounding plain. Conifers are interspersed with aspens and these forest stands are interspersed by montane meadows. This mixture adds value, chroma, and texture contrasts. Water sources are absent from the mountain. Colors range from the light tans and greens of grasses and yellows and whites of aspens, to the dark browns of soils and dark greens of the conifers. Seasonal patterns add further variety. The random natural patterns of the mountain contrast interestingly with the very geometric patterns of the adjacent farmlands. Ute Mountain is one of four mountains of similar visual character in the area: San Antonio Peak, Cerro de la Olla, and Guadalupe Mountain. San Antonio Peak and Ute Mountain, because of their height and the nature of their surroundings, are visual elements in the landscape for a considerable distance: 35 miles to the north and 44 miles to the south. A couple of unimproved roads extend partially up the base of Ute Mountain; they are minor modifications. Also, evidence of logging operations (stumps and tops) dating back some 30 to 50 years may be seen on the northern slopes; this aspect is a negligible modification in the landscape.

Source: PNM 1979.

APPENDIX G

CALCULATION OF GRAZING VALUES

Dollar-value figures for the AUMs of grazing that may be lost as a result of the land exchange are not available. The BLM has set a 1981 grazing fee of $2.30. This would make the 3,049 AUMs lost in the proposed Ute Mountain Exchange worth approximately $7,012 to the BLM. The 1979 average monthly rate per head for pasturing cattle on privately owned land in New Mexico was $6.70. This would make the AUMs lost through the exchange worth $20,428 per year.

The Navajo livestock operators frequently have sheep and/or goats rather than cattle. An estimate of gross AUM value was made using 1979 New Mexico agricultural statistics.

Cash receipts	$14,723,000
Value of home consumption	1,635,000
Value of wool	4,580,000
Gross receipts	$20,938,000

January 1, 1979 sheep and lamb inventory	604,000 head
Sheep death loss	-75,000 head
Net sheep inventory	529,000 head

Using the above figures, the value per AUM was derived as follows.

$$\frac{529{,}000 \text{ head of sheep}}{5 \text{ head sheep/cow}} = 105{,}800 \text{ Animal Units (AUs)}$$

$$105{,}800 \text{ AUs} \times 12 \text{ months} = 1{,}269{,}600 \text{ Animal Unit Months (AUMs)}$$

$$\frac{\$20{,}938{,}000 \text{ gross receipts}}{1{,}269{,}600 \text{ AUMs}} = \$16.49/\text{per AUM}$$

There are some questions about the validity of this kind of estimate because the inventory and death loss figures may be interpreted differently. However, the figures do give an approximation.

glossary

GLOSSARY

ACTIVITY OCCASIONS. One person participating in one recreation activity during 12 or more hours of one day.

ALLOTMENT. An area of land designated and managed for grazing of livestock.

ALLOTMENT MANAGEMENT PLAN (AMP). A documented program which applies to livestock operations on the public lands, which is prepared in consultation with the permittee(s) or lessee(s) involved, and which: (1) prescribes the manner in and extent to which livestock operations will be conducted in order to meet the multiple-use, sustained-yield, economic, and other needs and objectives as determined for the public lands through land use planning; and (2) describes the type, location, ownership, and general specifications for the range improvements to be installed and maintained on the public lands to meet the livestock grazing and other objectives of land management; and (3) contains such other provisions relating to livestock grazing and other objectives as may be prescribed by the authorized officer consistent with applicable law.

ALLUVIUM. Unconsolidated geologic material deposited by water; usually contains and transmits water.

ANIMAL UNIT MONTH (AUM). The amount of forage required to sustain the equivalent of one cow, one horse, two elk, three Barbary sheep, five domestic sheep, five goats, five deer, or ten antelope for one month.

AQUIFER. A rock formation containing water and capable of transmitting it to a well.

AREA OF CRITICAL ENVIRONMENTAL CONCERN (ACEC). An area within the public lands where special management attention is required (when such areas are developed or used, or where no development is required) to protect the area and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect life and safety from natural hazards.

BASALT. A type of rock formed by ancient flows of lava; this rock is usually high in iron and magnesium silicates.

BIOME. The largest, most easily recognizable community occurring on land. It is described by the major form of vegetation present. In a given biome, the form of the vegetation is uniform; e.g., coniferous forest, woodland, grassland.

CHANNEL SEEPAGE. The loss of streamflow due to seepage into the channel bottom.

CLASS I, II, III, OR IV AREAS (PALEONTOLOGY). Locations determined to have different importance values according to the type of fossils present and the mitigation of impacts recommended (refer to Appendix B).

DISPERSED RECREATION. Consists of those outdoor recreation activities that occur outside of areas that are intensively managed to facilitate concentrated recreational use. The recreational emphasis in this category is on the environment, with a close correlation between the environmental quality and the quality of the recreational experience. The environment is viewed as important for its own itrinsic values.

ECOSYSTEM MAINTENANCE SPECIES. Those species that make up the bulk of an ecosystem's animal life but which are not included in recovery (listed) or harvest (game/furbearers) categories. They are important because they make a given ecosystem what it is. Because society has not singled them out by law for high-intensity preservation or for sport and commercial harvest, they are not normally recognized individually.

EPHEMERAL STREAM. A stream that flows only in response to a storm event.

FLOODPLAIN. A relatively flat area of stream-laid deposits subject to repeated flooding.

GROUND WATER INFLOW. The movement of water from beneath the ground surface into a stream, thereby increasing streamflow.

GROUP I, GROUP II. State listed animals are placed in either Group I or Group II. New Mexico Group I animals are those whose prospects of survival or recruitment in the state are in jeopardy. Group II animals are those who prospects of survival or recruitment within the state may be in jeopardy in the foreseeable future (NMDGF 1979).

HARVEST SPECIES. A species subject to sport or commercial utilization under regulations of the New Mexico Department of Game and Fish.

HUMATES. Carbonaceous claystones or shales rich in decomposed organic matter. They are usually found in close association with coal deposits and are used as a soil conditioner.

IGNEOUS ROCK. Rock formed by the solidification of a molten material.

IMPORTANCE VALUE (PALEONTOLOGY). The degree of scientific worth and necessity for mitigation of a specific fossil assemblage (refer to Appendix B of this document for a discussion of these classifications).

INFRASTRUCTURE. The basic framework of community social support sub-systems, such as transportation, law enforcement, health care, and waste disposal.

LODE CLAIM. A type of mining claim that is staked on a deposit that is in place in a vein, ledge, zone or belt of mineralized rock lying within boundaries clearly separating it from the surrounding rock.

MANAGEMENT FRAMEWORK PLAN (MFP). BLM's land use plan for public lands that provides a set of goals, objectives, and constraints for a specific planning area to guide the development of detailed plans for the management of each resource.

PERENNIAL STREAM. A stream that flows all year.

RECOVERY SPECIES. A species listed by the federal or state government as endangered or threatened (rare). The intent of such listing is to provide protection and management authorities so that these species may be restored to desired levels and avoid extinction.

RECURRENCE INTERVAL. A statistical term used to express the probability of a given flood flow. For example, a 100-year flood has a one percent chance of occurring in any given year. A five year flood has a 20 percent chance of occurrence each year.

RIPARIAN. Pertaining to, or living on, the bank of a river, a lake, or tidewater. May also include temporary waters, generally refers to vegetation.

SCENIC QUALITY RATING UNIT: A portion of the landscape which displays primarily homogeneous visual characteristics of the basic landscape features (land and water form, vegetation, and structures) that separate it from the surrounding landscape.

SECTION 3 ADMINISTRATION. Applies to public lands within grazing district boundaries that are administered in accordance with Section 3 of the Taylor Grazing Act.

SECTION 4 PERMIT. A permit issued by the BLM for the licensee to construct a project on public lands. The project must be built to BLM specifications. The licensee has sole interest in the project on public lands, including maintenance.

SECTION 15 ADMINISTRATION. Applies to public lands outside grazing district boundaries that are administered in accordance with Section 15 of the Taylor Grazing Act.

STREAMFLOW AUGMENTATION. Any method used to increase natural streamflow; usually used to preserve some high-quality natural values of a stream.

TAXA. The various classification of fossils, plants, or animals in groups according to their presumed natural relationships.

references

REFERENCES

Caulfied, Jr., H.P. 1979. Political Considerations in Wildlife Conservation--Principles and Practices. Edited by R.D. Teague and E. Decker. pp 45-48. The Wildlife Society. Washington, D.C.

Geohydrology Associates, Inc. 1980. Aquifers Associated with Strippable Coal, San Juan Basin, New Mexico. Prepared for the Energy and Minerals Department, Mining and Minerals Division, Santa Fe, N. Mex.

Herman, John. 1980. Ute Mountain Recreation Plan, A Field Study. Submitted to Bureau of Land Management, Taos Resource Area Manager. Taos, N. Mex.

Jared, V. and Boss, A.S. technical coordinators. 1980. California Wildlife and their Habitats: Western Sierra Nevada. Gen. Tech. Rep. PSW-37. Pacific Southwest Forest and Range Exp. Stn. Forest Service U. S. Department of Agriculture. Berkeley, California.

Kues, B.S., Froelich, J.W., Schiebout, J.A. and Lucas, S.G. 1977. Paleontological Survey, Resource Assessment, and Mitigation Plan for the Bisti-Star Lake Area, Northwestern New Mexico. Prepared for the Bureau of Land Management, Albuquerque District Office. Albuquerque, N. Mex.

New Mexico Department of Game and Fish. 1978. New Mexico Department of Game and Fish Comprehensive Plan, Part 2: Game Maps.

New Mexico Department of Game and Fish. 1979. Handbook of Species Endangered in New Mexico.

New Mexico Natural Resources Department State Heritage Program. 1980. Heritage Information Statistical System. A Computer Printout of Threatened and Endangered Plants and Animals in the Chaco Planning Unit. Santa Fe, N. Mex.

New Mexico State Planning Office. 1976. State Comprehensive Outdoor Recreation Plan (SCORP). Santa Fe, N. Mex.

Obenauf, Margaret S. 1980. The Chacoan roadway system. Unpublished Masters Thesis. University of New Mexico, Albuquerque.

Odum, E.P. 1971. Fundamentals of Ecology 3rd edition. W. B. Saunders Company. Philadelphia, Pa.

Public Service Co. of New Mexico. 1979. Environmental Resource Evaluation of the Proposed Top O'World Exchange Lands. Albuquerque, N. Mex.

Spellenberg, Richard. 1976. A report on the Survey for Threatened or Endangered Plant Species on the Bisti-Star Lake Area, Northwestern New Mexico. Prepared for the Bureau of Land Management, Albuquerque District Office, by Whitford Ecological Consultants. Las Cruces, N. Mex.

Thomas, J.W. Tech. ed. 1979. Wildlife Habitats in Managed Forests—the Blue Mountains of Oregon and Washington. Agriculture Handbook No. 553. U.S. Department of Agriculture, Forest Service. Washington, D.C.

U. S. Department of Agriculture, Forest Service. 1978. Run Wild Wildlife Information Storage and Retrieval System. Southwestern Region and Rocky Mountain Forest and Range Experiment Station. Fort Collins, Co.

_____. 1980. Biotic Communities of the Southwest. Rocky Rocky Mountain Forest and Range Experiment Station, Fort Collins, Co. General Technical Report RM-78 (D.E. Brown and Charles H. Lowe).

U. S. Department of Agriculture, Soil Conservation Service. 1975. Average annual water yield, New Mexico, April, 1972: A Map. Portland, Ore.

_____. 1976. National Range Handbook.

_____. 1977. Taos Area Soils Survey. Portland, Ore.

U. S. Department of Housing and Urban Development, Federal Insurance Administration. 1977 and 1978. Flood Hazard Boundary Maps.

U. S. Department of the Interior, Bureau of Land Management. 1973. Wildlife Program Activity Policy Statement. BLM Manual Release 1-835. Washington, D.C.

_____. 1979a. Star Lake-Bisti Regional Final Environmental Coal (#FES-INT-79-11). Washington, D.C.

_____. 1979b. Wetland-Riparian Area Protection and Management. BLM Manual 6740 Release 6-69. Washington, D.C.

_____. 1980a. Bisti Region Multiple Resource Program Final Report. Albuquerque, N. Mex.

_____. 1980b. Chacoan Community Cultural Resources Interim Management Plan. Albuquerque, N. Mex.

_____. 1980c. Feasibility Study. Top O'World Ute Mountain and San Juan-Bisti Lands Exchange. Taos Resource Area Staff. Tao, N. Mex.

_____. 1980d. Unit Resource Analysis; Chaco Planning Unit. Albuquerque and Farmington, N. Mex.

_____. 1981. Inventory of Selected Lands for the Bisti-Ute Mountain Land Exchange. Files at BLM Albuquerque District Office.

U. S. Fish and Wildlife Service. 1979. Classification of Wetlands and Deepwater Habitats of the United States. Publication FWS/OBS - 79/31. Washington, D.C.

U. S. Geological Survey. 1980. Data retrieved from the USGS Computer file WATSTORE.

Wilson, L., Anderson, S., Jenkins, D., and Lovato, P. 1978. Water availability and water quality, Taos County, New Mexico. Vol. VII, p. 27.

Winograd, I.J. 1959. Groundwater conditions and geology of Sunshine Valley and Western Taos County, New Mexico. New Mexico State Engineer Technical Report 12.

York, Frederick F. March 18, 1981. Letter to the BLM discussing the significance and providing a legal description for the crane petroglyph and the approximate location of Tiz-na-tzin Trading Post. Ethnohistorian, independent cultural resources contractor. Albuquerque, N. Mex.